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PRACTICAL MEASURES IN THE PREVENTION AND TREATMENT OF PUERPERAL SEPSIS

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NEW YORK

The cause, prevention and treatment of puerperal sepsis have been discussed since obstetrics began to have a literature of its own. It is held as a reproach to the medical profession that puerperal sepsis still continues to take such a large toll of human life and that efforts for its prevention and cure have fallen far short of success. Of late years there has been much criticism in the lay press regarding the present state of affairs. Such publicity is good so far as it stimulates improvement, but, since much that is written distorts the facts or puts them in the wrong perspective, it is harmful. That the medical profession is alive to the problem is evidenced by the vast amount of work being done on it in every part of the world, and by the voluminous literature that has accumulated in the past ten years.

Space will not permit of even a partial review of that literature, so for the purposes of this communication it will be referred to only as it has a bearing on present conceptions of etiology and on practical measures of prevention and treatment.

PREVENTION

Puerperal sepsis is the disease *par excellence* to which the dictum "prevention is better than cure" is applicable; for when once a virulent organism has gained access to the puerperal uterus with its large venous sinuses, its abundant, dilated lymphatic channels and its constant muscular activity, the chances of a massive invasion of the blood and lymph streams are very great, and the patient may quickly be overwhelmed in spite of any means of treatment that are available at the present time.

Relative to the prevention of puerperal sepsis, a distinction must be made between the exogenous method of infection by organisms from without and the endogenous method of infection by organisms already present in the body of the patient. In exogenous infection the most common invading organism is one of the streptococcus group, and the most virulent of these is the hemolytic streptococcus.

How do such organisms gain access to the uterus? Obviously, they may be conveyed directly to the genital tract by the fingers of the attendant if he has a streptococcic lesion on his hands when he makes a vaginal examination. One must not lose sight of the possibility of the patient herself introducing her fingers into the vagina during the course of labor, or of coitus occurring shortly before. Such occurrences are probably much more frequent than is generally assumed. There must be few instances today of a physician with an obvious infective lesion on his hand taking an active part in the conduct of a labor. The wrongfulness of such a proceeding is so obvious that nothing more need be said about it.

There are, however, more subtle ways in which the streptococcus may gain access to the uterus. It is a widely distributed organism and it can reach the human organism through various channels, causing in one case tonsillitis, in another mastoiditis, pneumonia or scarlet fever. It is impossible to determine the manner in which the individual inoculation takes place, and so it may be with uterine infection. There is general agreement that the same streptococcus which is responsible for all these diseases is responsible also for puerperal sepsis, and there is accumulated evidence showing that streptococcic puerperal infections are most frequent when these other diseases are prevalent in the community.

The hemolytic streptococcus does not survive long outside the body, so that it is seldom possible to recover it even from the immediate environs of an infected patient. It is, however, very frequently found in the nose and throat of individuals in attendance on such patients and of many persons who have had no known direct contact. The proportion of apparently healthy individuals who harbor the hemolytic streptococcus in the nose or the throat is put as high as 45 per cent by Davis,[1] and the occurrence in individuals with tonsillar crypts is placed at 100 per cent by Pilot and Davis.[2] Hare [3] has recently shown that virulent streptococci are obtained from the throats and the noses of individuals with infection of the respiratory tract, even though there are few symptoms. His test of virulence is the power of the organisms to resist phagocytosis in normal human blood.

There are now many recorded instances in which by agglutinin absorption tests the organism in the throat and the nose of the attendant and that recovered from a case of puerperal sepsis have been proved to be identical.

One of the most striking instances of this kind was recorded recently by Smith.[4] A physician attended three patients in their own homes, situated three miles apart. Streptococcic septicemia developed in all three and all of them died. In regard to this instance, Smith writes:

> Serological examination showed that all strains obtained from the uteri and blood of the three patients were identical with that obtained from the doctor's throat. Not only so, but during

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1. Davis, D. J.: J. Infect. Dis. **29**: 524 (Nov.) 1921.
2. Pilot, I., and Davis, D. J.: J. Infect. Dis. **24**: 386 (April) 1919.
3. Hare, Ronald: J. Path. & Bact. **38**: 129 (March) 1934.
4. Smith, J.: J. Obst. & Gynaec. Brit. Emp. **40**: 991 (Oct.) 1933.

her brief illness at home Mrs. J. S., was attended by her sister, Mrs. G., and this woman developed a severe tonsillitis on the day following the removal of Mrs. J. S. The tonsillitis was followed by an acute otitis, and from the pus a hemolytic streptococcus serologically identical with the other strains was also cultured.

Smith records other almost equally striking cases, and the literature of the past few years recounts many more. One is therefore driven to the conclusion that the nose and throat carrier of Streptococcus haemolyticus is the cause of the great majority both of the sporadic form and of the epidemic form of hemolytic streptococcic puerperal infections.

In order to emphasize the practical measures that can be taken to prevent or minimize the danger of hemolytic streptococcic infections, I shall outline briefly the routine carried out in my service in the Sloane Hospital for Women.

1. *Detection of Carriers.*—Cultures from the throat and nose are taken in a routine manner from all persons, including the physicians, students and nurses who may come in contact with women in labor or in the puerperium. All pupil nurses must bring with them from their respective schools a certificate of a negative hemolytic streptococcus culture from the nose and throat. Individuals from whom positive cultures are obtained are excluded from the direct care of patients, and the throat and nose are treated with 2 per cent solution of neosilvol. Duty is resumed when two successive cultures are negative.

2. *Use of Masks.*—Thorough masking of the nose and mouth is obligatory on every one who comes in contact with a woman at any stage of labor or during the puerperium. The mask is of four thicknesses of gauze and must completely cover the nose as well as the mouth. It must be worn by every one in the labor and delivery rooms, and by every nurse doing a perineal dressing in the wards. I believe that many patients are infected in the early puerperium and I lay great stress on the masking of the nurses in the wards. This insistence on masking savors of fussiness and is apt to be "pooh-poohed" and resented at first. However, it very quickly becomes a routine and is taken as much for granted as is the masking of the nurses, operator, assistants and spectators in the surgical operating room.

One of the hazards of hospital obstetrics is the number of contacts for each patient during labor and during the puerperium. For the past year we have kept a record of the contacts of each individual patient; by contacts is meant individuals who actually come in physical contact with the patient. In the case of ward patients the number of contacts during the course of labor has been as high as twenty-five; the average number is eleven. It should be stated that ours is a teaching institution.

With such potentialities for infection, the minimum precaution requires the effective masking of all such contacts.

3. *Isolation of Infected Cases.*—In the prevention of exogenous infection the isolation of frankly infected cases is obviously of great importance. Isolation should also be extended as will be detailed later, to all patients who may be carriers of the streptococcus in the genital tract, even though such patients are free of symptoms. The personnel in contact with these patients should not contact well patients, as such individuals are very likely to be carriers.

It may seem to some that undue emphasis has been placed on the carrier as the responsible agent in puerperal infection of exogenous origin, but from my personal experience and from a study of the literature of recent years I am convinced that the carrier is the major menace. Recognized carriers should, therefore, be excluded from attendance on obstetric patients, and as any one at any time may unwittingly be a carrier, proper masking should be used to protect the attendants' hands, gloves, dressings, instruments and external genitalia of the patients from that fine spraying from the mouth and nose which always occurs when one speaks or even breathes.

VAGINAL EXAMINATION

With this protection of the sterile field surrounding the patient, I do not believe that properly executed vaginal examinations are a menace to the patient. Penner and Gegerson, two members of this year's graduating class of the Columbia University College of Physicians and Surgeons, made a study of the morbidity of the patients in Sloane Hospital who had and who had not had a vaginal examination in the course of labor. They used for the study only strictly comparable cases. These studies indicated that there was no increased morbidity in those examined vaginally. I have never approved of rectal examinations during labor and this study encourages me to continue the use of vaginal examinations in the cases in which the procedure is necessary.

The vaginal examination must be made only with full exposure of the vulva and perineum, with thorough sponging off of the area surrounding the vaginal orifice, complete separation of the labia, and the absolutely direct introduction of the examining fingers without outside contamination. In this way, providing the gloves are sterile and the examiner is properly masked, the danger of introducing pathogenic organisms is reduced to a minimum. At the same time, the risk of introducing into the cervix and lower uterine segment organisms already present in the vagina is less than when the vaginal wall itself is pushed up into the cervix, as must occur during a rectal examination.

PLACE OF DELIVERY

A statistical investigation by Robinson, a member of the graduating class of the Columbia University College of Physicians and Surgeons, shows that the proportion of deaths from puerperal sepsis in relation to the total deaths is highest in the states in which the largest number of births takes place in hospitals, and that it is lowest in the states in which there is a larger percentage of home deliveries. Deaths from accidents of labor are lowest in the states with the highest percentage of hospitalization and highest in the states with the highest percentage of home deliveries. This would seem to prove that the hospital would be the safest place for the obstetric patient if sepsis could be controlled. There is, undoubtedly, a greater risk of contagion and of infection by carriers in the hospital, especially if the hospital is not properly planned, has no provision for isolation of infected cases and has an uncontrolled staff.

During the present year, we have made, for the first time, systematic cultures from the vagina of every patient in labor. During the months of January, February, March and April sixteen patients out of a total of 500 on whom cultures were made showed a hemolytic streptococcus in the vagina. None of these patients were febrile at the time, but all were isolated. Nine continued to harbor the streptococcus in the vagina during the puerperium but fever developed in

only one, and that was very mild. Three of the other seven patients had a mildly morbid puerperium, although the streptococcus could not be recovered after delivery.

During the spring months of this year streptococcic infections of all kinds have been prevalent in New York, but we have not had a single case of serious streptococcic infection in the Sloane Hospital. It may be mere coincidence, but it may be possible that our isolation of these nonfebrile streptococcus carriers has prevented other serious infections. The results of the work being done emphasize the need of constant watchfulness in every hospital in which obstetric patients are treated. Without proper control and without a proper structural arrangement an obstetric hospital may well be a less safe place for a patient than even the meanest home. It seems to me that the time is ripe for a revaluation of scope of home delivery for the normal case, and I would commend attention to the exhibit arranged by Dr. Plass in the Scientific Exhibit.

PREVENTION OF ENDOGENOUS INFECTION

The vagina of every pregnant woman and of every woman in labor contains organisms. These vaginal organisms ascend into the cervix and lower uterine segment in the later stages of labor and continue to do so in the early puerperium, so that by the third day the normal puerperal uterine cavity is heavily invaded, and it does not become sterile until the tenth or twelfth day.

Most of these organisms are not pathogens, but in a certain percentage of women there are present in the vagina during labor, and in the uterus in the early puerperium, organisms which by ordinary cultural tests are identical with those obtained from definite inflammatory lesions; yet, these women may show no febrile reaction. The potential pathogens most commonly found are various types of the nonhemolytic aerobic streptococcus: the anaerobic streptococcus, the staphylococcus and Bacillus coli. The hemolytic streptococcus is found in only from 1 to 3 per cent of individuals.

As I have previously mentioned, this organism was found in 3 per cent of the cases in the Sloane Hospital. The fact that no serious infection developed in any of our patients is in accord with reports from other clinics. Is this so because the individual patient has developed an immunity to her own organisms or is it because of the fact that the organisms are really nonvirulent?

According to Hare,[3] these vaginal streptococci found in nonfebrile cases are nonvirulent, as evidenced by their feeble resistance to phagocytosis in normal blood. It is known that the pathogenicity of the anaerobic streptococci as tested in laboratory animals is very small and in many instances altogether absent, and yet they may cause a very extensive and sometimes fatal puerperal sepsis. As more and more work is being done on these anaerobes, it would seem that they are responsible for the majority of the cases of mild and moderate puerperal infection, for many of the cases of thrombophlebitis and for not a few true septicemias.

There must be circumstances, therefore, under which all these apparently nonvirulent pathogens may become virulent and cause infection. The problem of the prevention of these infections must, therefore, be approached in two ways: (1) the elimination of the organisms from the genital tract before or during labor and (2) the avoidance of conditions that favor their acquisition of virulence.

Vaginal Antiseptics.—Douching of the vagina with antiseptic solutions during labor was suggested and practiced many years ago. The method was discarded when it was shown that the agents employed destroyed the vaginal bacillus of Döderlein, which by maintaining an acid environment inhibited the growth of other organisms. In the last ten years there have been renewed attempts to render the parturient canal sterile. Mayes [5] has been the chief proponent. He uses a solution of mercurochrome, which is instilled into the vagina at regular intervals during labor. He states that the septic death rate has practically been halved since the method was used. I have always felt that there were other factors responsible for the results which he undoubtedly obtained, especially the more careful supervision of all technic in the cases in which mercurochrome was used. This opinion is supported by the fact that it has been shown by Garrod [6] and others that mercurochrome is a very feeble germicide, in no way comparable with, for instance, brilliant green or iodine.

Colebrook [7] critizices the indirect evidence of lowered morbidity and mortality rates. He has carried out experiments on five women, using mercurochrome and other antiseptics, checking bacterial content of the vagina, before, during and after the treatment.

In regard to the results of these experiments he says:

> These five records show that the genital tract was not sterilized in any instance, following the repeated application of mercurochrome, crystal violet and brilliant green, or dettol. In two cases there were approximately as many organisms grown three hours after the first treatment as before. In all probability this failure is attributable to multiplication of the bacteria somewhere, perhaps, in the glands of the cervical canal, out of reach of the antiseptic.
>
> The outstanding feature of the results is that in four of the five cases the bacterial species originally present, species believed to be of little or no pathogenicity, were replaced or joined by other species of definitely greater pathogenicity; e. g., B. coli, B. proteus, hemolytic staphylococcus and fecal streptococcus. It would seem probable that the introduction of the chemical agent had so altered the mucosal cells or their secretions as to permit these species, which are not normally present, to establish themselves.
>
> Although the number of cases is admittedly small this investigation suggests the tentative conclusion that it is inadvisable to attempt to improve upon nature's arrangements for keeping the genital tract free from pathogenic bacteria.

Holding the view expressed by Colebrook, I have never systematically used vaginal antiseptics, but I have an open mind on the subject and am more than willing to adopt any method when it is proved to be efficacious.

Control of Conditions Favoring Endogenous Infection.—In studying the cases of febrile morbidity in the Sloane Hospital for Women we find that the three most commonly associated conditions are prolonged labor, extensive lacerations and excessive hemorrhage. These are all conditions which in their inception and in their control favor exogenous infection; but with a uniform technic for all cases it is fair to assume that the consistently higher incidence of infection under the circumstances mentioned is due, at least in part, to the activation of organisms already present in the vagina.

The avoidance of these three prime factors can be accomplished only by the exercise of the best obstetric judgment and technical skill. An increased morbidity does not follow a high incidence of low forceps deliveries if these are done with skill and gentleness, but it does follow a high incidence of mid forceps and

5. Mayes, H. W.: Am. J. Obst. & Gynec. **10:** 1 (July) 1925; ibid. **23:** 627 (May) 1932; Surg., Gynec. & Obst. **54:** 529 (Oct.) 1932.
6. Garrod, L. P.: Brit. M. J. **1:** 572 (April 4) 1931.
7. Colebrook, L., and Maxted, W. R.: J. Obst. & Gynaec. Brit. Emp. **40:** 966 (Oct.) 1933.

high forceps deliveries, and it does follow a high incidence of prolonged labors, whether these ultimately terminate normally or are completed by operation.

Given a definite indication for operative delivery and given the conditions necessary for its proper performance, the sooner it is done the better. The proved parallelism between increased operative intervention and increased septic morbidity and mortality is due to that intervention being performed, in many instances, on wrong indications, at the wrong time and by unskilled operators. General improvement will result only when it is recognized by every practitioner that a large number of obstetric procedures are of major surgical importance, that they can be undertaken with impunity only by one who has had special training, and that even in skilled hands the results will be disastrous if the procedure is attempted at the wrong time or in the wrong case.

TREATMENT OF PUERPERAL INFECTIONS

I confess that I approach this part of my subject with a sense of futility for, like the late Whitridge Williams, I am more or less of a fatalist so far as the outcome of a case of puerperal infection is concerned. That outcome depends mostly on the virulence and invasiveness of the infecting organism, and to a lesser extent on the tissue reaction and resistance of the individual. So far, no specific has been found that will act with certainty on the organism or its toxins, so one must fall back on the second line of defense and do everything possible to increase the resistance of the tissue. Elsewhere,[8] I have summarized the present day knowledge regarding antibacterial and antitoxic serums, vaccines and nonspecific therapy. Space will not permit a recapitulation of these, so I shall limit myself to a short summary of the method of treatment we employ in cases of puerperal infection in my service.

When a puerperal patient shows an oral temperature of 100.4 F. or higher on two readings at intervals of four hours, she is transferred to the isolation unit and individualized in all details of nursing care in one of the glass-screened cubicles in a ten-bed ward. A thorough general examination of the throat, lungs, heart and kidneys is made. The uterus is palpated abdominally, the lochia is examined, a culture is taken from the vagina and a blood culture is made. If the uterus is tender and larger than it ought to be, an ice-bag is placed over it and the patient is given three oral doses of 5 grains (0.3 Gm.) of quinine sulphate daily. If the lochia is profuse or foul, the shoulders are elevated in the Gatch frame. The diet is light and nourishing; a small enema is given daily and, if necessary, a mild cathartic, such as magnesia magma, is used. In the majority of cases beginning in this way the condition is an endometritis, which may be due to a variety of organisms with a probable preponderance of the anaerobic streptococcus. Most of these patients make a rapid recovery with no other treatment, so that in a few days the temperature falls to normal, the uterus begins to involute normally, and the lochia becomes less profuse and loses its odor. With this probable outcome we are careful to do nothing that might favor an extension of the infection beyond the uterus. No pelvic examination is made other than to inspect any perineal lacerations and take a culture from just within the vaginal introitus. The uterus is not manipulated from the abdomen.

If the temperature does not fall, one of four things is happening: (1) The infection in the uterus is continuing but remaining localized. (2) Extension has taken place to the pelvic cellular tissue. (3) Infection has extended to the pelvic veins (septic thrombophlebitis). 4. There is invasion of the blood stream. Cultures of the blood are made regularly so long as fever persists. If the patient shows a progressive anemia, or is losing ground, a blood transfusion of 500 cc. is given by the direct method. This may be repeated every three or four days, the amount given each time being from 250 to 400 cc. No vaginal or bimanual examination is made, unless the culture from the vagina has been indeterminate, in which case, with the utmost gentleness, a culture is taken from within the cervix.

If it appears from the negative blood culture and from the absence of the signs of thrombophlebitis, that the infection is still limited to the uterus, we continue to pursue a course of masterly inactivity. We do not use glycerin injections into the uterus nor the introduction of drains with irrigation, as advocated by some, because we believe that in most cases they may do more harm than good. I can still recall the frequency of chills following intra-uterine irrigations during my intern days.

A thrombophlebitis will be indicated by costovertebral tenderness and tenderness over one or both sides of the pelvic brim, a fluctuating temperature, high leukocytic count and sometimes definite chills. Many cases of thrombophlebitis, however, show only a low grade temperature, perhaps not over 100 F., over a period of a week or ten days, and at the end of that time declare themselves by the occurrence of an embolus and a pulmonary infarct. We have observed this so often that we are highly suspicious of all such low grade temperatures unless something definite can be found to account for them. Therefore, we keep such patients in bed until the temperature has been normal for several days.

In cases in which an embolus occurs there is usually marked dyspnea and orthopnea. The patient is propped up and given a hypodermic injection of morphine. In severe cases an oxygen tent may be necessary. Enemas are stopped and she is kept quiet with codeine, from one-half to 1 grain (from 0.03 to 0.065 Gm.), every four hours. Small meals are given every two hours. The patient is kept in bed until the white cell count of the blood is normal and the temperature has been normal for a week.

The majority of these patients with thrombophlebitis, even with an embolus, recover. So far I have not undertaken any of the formidable operative procedures recommended and practiced by obstetricians in this and other countries, such as transperitoneal or extraperitoneal ligation of the pelvic veins, excision of the thrombosed veins and removal of the uterus with drainage through the vagina. In two cases I was very much tempted to operate but forebore, and the patients recovered.

Our operative treatment of puerperal infections at Sloane Hospital is limited. A pelvic abscess is opened, but we are never in a hurry to explore those massive cellulitic exudates which are sometimes found, until there is definite evidence of softening and fluctuation. Most of these exudates absorb without suppuration. We drain the peritoneum through the posterior fornix or through a small incision above the pubes in cases of early peritonitis following septic abortion, and in the rare early case following full term delivery. The peri-

8. Watson, B. P., in Curtis, A. H.: Obstetrics and Gynecology, Philadelphia, W. B. Saunders Company **2**, 1933.

tonitis developing late in a case of puerperal sepsis is usually just one expression of the wide hematogenous and lymphatic extension, and operation is useless. We never explore or curet the uterus in cases of septic incomplete abortion until the temperature has been normal for three days and we know that the organism is not a hemolytic streptococcus. Cases in which there is excessive hemorrhage, the control of which may necessitate taking the risk of emptying the uterus, constitute the one exception to this rule. I perform a hysterectomy in the rare cases of uterine abscess and of necrosis of a uterine fibroid encountered during the puerperium.

When a definite hematogenous infection is present the case is by no means hopeless. Many patients with a bacteremia recover. It is this fact that makes it so difficult to assess the value of any therapeutic measure employed. We have used various intravenous medications, many types of streptococcus serum, both supposedly antibacterial and antitoxic, and I have not been able to satisfy myself that any one has been of real value in saving a life that would otherwise have been lost.

Hope for the future lies in the work of Warnekros,[9] Lash and Kaplan[10] and many others who are trying to produce a specific antitoxic serum.

Meantime, blood transfusion has come to be our standby used in the way already mentioned. I have had no experience with immunotransfusion, but those who have used it believe that it may be more efficacious than transfusion from the untreated donor.

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ABSTRACT OF DISCUSSION

DR. J. C. LITZENBERG, Minneapolis: Any contribution leading to the lessening of the mortality of puerperal sepsis is timely. The author has established the thesis that the curative treatment cannot be relied on, it being necessary to direct one's efforts almost exclusively to prevention. The greatest statistical progress in the prevention of puerperal sepsis followed a few years after the work of Semmelweis and Holmes. Since that time, however, the statistics have remained more or less stationary. I wish to emphasize that Dr. Watson has made a distinct contribution by declaring that sepsis due to the hemolytic streptococcus, has been proved by his investigations to be due in a vast majority of cases to a carrier. When rubber gloves were introduced and actually sterile hands became available for the conduct of labor, it was thought that the question of puerperal sepsis would now be solved. Disappointment resulted because of the overconfidence in sterile hands. It was found that the germs were carried in just as frequently by the sterile glove because the genitalia could not be rendered sterile, and that the infection would come from a clean hand carrying germs from outside in. Dr. Watson has emphasized the point that even a sterile hand may carry the infection upward. The carrier, by speaking or even by breathing may bring a fine spray of germs on the genitalia. The author therefore has urged a method of preventing this which he says may appear fussy. However, in the question of puerperal sepsis it is well to be fussy, because results have been entirely unsatisfactory and more or less a reproach on the medical profession. The taking of cultures from carriers in the prevention of all infectious disease has been one of the greatest advances in modern medicine. Dr. Watson has emphasized that there may also be the carrier of the hemolytic streptococcus, which is the most virulent organism and the principal cause of mortality in sepsis. Therefore, I commend his emphasis on this most valuable addition to the prevention of puerperal sepsis, for prophylaxis is the only solution. The treatment after the infection has occurred is most unsatisfactory.

DR. JOSEPH B. DE LEE, Chicago: Some years ago I collected authentic reports of twenty-nine epidemics of puerperal infections in hospitals, and of the twenty-nine only one hospital had the nerve, the scientific love for verity, to report the epidemic, and that hospital was Dr. Watson's.

DR. A. F. LASH, Chicago: I wish to speak of the statistics in Cook County Hospital in Chicago, which in a sense is comparable in its population to that of New York. In a review of 500 cases of puerperal sepsis last fall it was found that the mortality in home deliveries was four times that of the hospital deliveries; secondly, 35 per cent of the septic patients had operative deliveries, as compared to an incidence of only 6 per cent of operative deliveries in the nonseptic patients. Dr. Watson has well emphasized the importance of bacteriology in reference to infection. I think, as he has demonstrated, that the bacteria may be present and yet the woman will not develop an infection. The explanation is to be found in the patient's healthy local and general immunity, the local immunity consisting of a normal epithelial layer throughout the uterovaginal tract, while the general immunity is made up of the various types of antibodies. I was much surprised not to hear Dr. Watson speak of any experience with the antitoxic streptococcus serum. If there is anything that may improve the patient's general immunity it is the antitoxic serum if it is used early. As in all streptococcic infections, serum is of value only when administered early. If the diagnosis of puerperal sepsis is made early from the typical course of puerperal fever and the presence of a hemolytic streptococcus in the cervix, and if serum is given, the incidence of fatal cases will certainly decrease. I am sure that every one who has had any extensive experience with puerperal sepsis knows that there is a certain group of patients that will develop puerperal sepsis no matter how careful or how skilled the obstetrician is, and it is in such cases that I feel that serum is especially indicated. It has been our experience in the Cook County Hospital that most of our deaths have occurred from puerperal infection following septic abortion in which peritonitis occurs very early in the course.

DR. J. I. HOFBAUER, Cincinnati: Experience in the university clinic of Koenigsberg fully bears out the significance of carriers of streptococci in the conveyance of infection. Masking certainly plays an important part in the prevention of transmission of infection. But the mask must be properly applied. As to the benefit derived from serums in the treatment of puerperal infection, I am rather skeptical. On the other hand, transfusion of between 300 and 400 cc. of blood repeated at proper intervals represents an important element in the treatment. The question why puerperal infections occurring during the early months of pregnancy exhibit a severer course, quite often, than following labor at term may be accounted for by the presence in the parametrium, at term of a well developed defensive mechanism, which is lacking at previous stages of pregnancy.

DR. WILLIAM H. VOGT, St. Louis: So far as the treatment of puerperal sepsis is concerned, I do not believe that physicians are any further today than they were years ago, except perhaps for the use of blood transfusions. Therefore, the prime thing is prevention. In July of last year I took over the service at St. Mary's Hospital in St. Louis and being aware of Dr. Watson's work, namely, the careful masking of the entire personnel and the culturing of noses and throats, I carried this out in detail. It was surprising to see the large number of noses and throats of the nurses, doctors and students that harbored Streptococcus haemolyticus. All who showed positive cultures for Streptococcus haemolyticus were eliminated from the service and were treated and were not allowed to come back into the department until the condition had entirely cleared up. Furthermore, the entire personnel who go into the nursery have been masked as well, so as to prevent any infections in the respiratory tract of new-born infants. It is, however, interesting to see today what objections are still encountered, and I can readily see what difficulties Semmelweis had in his time when today among the men visiting hospitals some still object to following out the method of masking, gowning and capping themselves for routine examinations. Dr. Watson also

9. Warnekros, K.; Lowros, N., and Becker, N.: München. med. Wchnschr. **73**: 2155 (Dec. 17) 1926.
10. Lash, A. F., and Kaplan, Bertha: Puerperal Fever; Streptococcus Haemolyticus Toxin and Antitoxin, J. A. M. A. **86**: 1197 (April 17) 1926.

brought out another important thing; namely, the masking of the nose as well as the mouth. It is always interesting to me to go into operating rooms and see only the mouth of the operator covered. I dare say that in 75 per cent of operating rooms only the mouth is masked. If it is important to mask the mouth and the nose in obstetrics it would seem to me that it is equally important to do the same thing in surgical work.

DR. B. P. WATSON, New York: There is a good part of my paper which I was unable to read and in which I did enter into some discussion as to the use of serum, especially the antitoxic serum, in the treatment of puerperal sepsis. I think it is only along the line of the work of Warnekros that any strides are likely to be made in the treatment of the disease and in the development of a puerperal antitoxic serum, which, as Dr. Lash says, must be given very early if it is going to do any good at all. The question of whether the patient who harbors hemolytic streptococci in the vagina has a true immunity to that organism, or whether the organism is actually a nonvirulent organism, is still debated. The recent work of Hare would seem to show that most of these organisms in the vagina of nonfebrile patients are really not virulent, but it is not known whether the transfer of that organism to another individual might not make it virulent. I am in entire agreement with Dr. Hofbauer with regard to the defensive mechanism in the periuterine tissue in the later stages of pregnancy, as manifested by the development there of the clasmatocytes. I am especially grateful to Dr. Vogt for supporting me in the emphasis I have tried to place on the importance of the carrier and the necessity for masking whenever one comes in contact with a woman in labor. Like Dr. Vogt, I also insist on every woman masking in the nursery.

THE MANAGEMENT OF PERFORATED APPENDICITIS

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In hands of average competence and ability, inflammation of the appendix represents a surgical condition that should not and usually does not involve mortality. Yet owing to the lack of appreciation of the significance of early symptoms and because of "home treatment" and delayed surgery, a simple surgical condition progresses to the stage of complications that are ultimately responsible for a tremendous death rate. This is especially appalling when one observes its incidence in the younger age groups. Because of this incidence and the fact that the primary lesion carries no significant danger into later life, appendicitis represents a far more satisfying field for organized educational efforts than do malignant conditions.

We are presenting a review of our cases of appendicitis for the six years from Jan. 1, 1928, to Jan. 1, 1934. Those years have been chosen because with the beginning of that period occurred the opening of Dick Hall's House, the Dartmouth College student infirmary. This is operated as a wing of the Mary Hitchcock Memorial Hospital, which in turn serves a wide rural area. The great majority of the patients of Dick Hall's House are college students who should be expected to have more than average ability to recognize the need of medical attention. They are not surrounded by experts in "home treatment," early medical observation is insured by a system under which janitors report sick students to the medical director, and they are seen from the beginning by members of our own staff. While it is obvious that this group of cases may be termed preferred risks, it also falls largely within the greatest age incidence of appendicitis, although there are included graduate students and faculty members. We shall consider this as the controlled group. The more miscellaneous patients of the Hitchcock Hospital are referred from distances up to 75 miles and may be considered as the uncontrolled group. And so we discuss two groups of appendicitis cases—controlled and uncontrolled—the only common factor in the management of which is that they have been operated on by the same surgeons.

The controlled group comprises 110 cases with no mortality; the uncontrolled group is one of 791 cases with 17 deaths, a mortality of 2.15 per cent. The total series, therefore, constitutes 901 cases in which operations were performed for appendicitis, with 17 deaths, a mortality of 1.89 per cent.

For the purpose of discussing the cases of perforation, our series has been classified in the following manner:

1. Uncomplicated appendicitis.
2. Acute appendicitis with exudate and local peritonitis.
3. Gangrenous appendicitis with local peritonitis, with or without perforation.
4. Appendiceal abscess.
5. Perforated appendicitis with general peritonitis.

The incidence according to this classification is given in the accompanying table.

It is perfectly apparent that classifications of appendicitis are of little value for comparative purposes, because classification on a basis of conditions found at operation is as variable as the personal interpretation of these conditions by the operating surgeon. It is equally obvious that classification based on the preoperative duration is still more erroneous in assuming that the pathologic process is constant under all conditions and in all individuals. All physicians have seen too many instances in which a six-hour history presents a more serious process in one case than a thirty-six hour duration in another.

Of the total of 901 cases, drainage was done in 235, or 26 per cent, for varying degrees of peritoneal involvement, with sixteen deaths, a mortality of 6.8 per cent. Group 1 is uncomplicated and drainage is not done, and in each series is made up of acute, subacute and chronic cases of operation primarily and solely for appendicitis. All of the ninety patients in the second group were given local drainage with but one fatality, resulting from cerebral embolus in a man, aged 73. While the results of such a conservative attitude toward drainage in the early cases seem satisfactory, one postoperative obstruction occurred in this group, possibly as a result of the presence of drains, but recovery occurred following jejunostomy. In ninety-three cases of gangrenous appendicitis with peritonitis with or without perforation there were six deaths, representing 6.45 per cent. In thirty cases of perforation with local abscess there was one fatality. Of 235 drained cases, we have classified twenty-two as perforated appendicitis with general peritonitis. With such a small number in this group we may have been severe on ourselves, but certainly there is no dilution of the group by false inclusions or by exclusion of any of the six deaths in group 3.

In many previously reported series of appendicitis, divided into two main groups of cases with and with-

From the Hitchcock Clinic.
Read before the Section on Surgery, General and Abdominal, at the Eighty-Fifth Annual Session of the American Medical Association, Cleveland, June 14, 1934.

out drainage, from 30 to 50 per cent of the total cases in which drainage has been done have been listed as perforation with diffuse peritonitis. According to our criteria we feel that this incidence is high. Under the heading of perforation with general peritonitis we include only those cases with perforation usually of some duration, which beyond any question has resulted in a widespread peritonitis with obvious and extreme toxemia. These cases constitute less than 10 per cent of our cases in which drainage was done. Early perforations with local processes are classified in group 3. But in the latter group we feel that our inability to detect a gross perforation is no guide to the extent or severity of the peritonitis. In other words, bacterial penetration of a gangrenous appendix can produce as profound effects as actual rupture of the wall.

The wide variation in the mortality rate in these groups makes quite clear the effect of the factor of operability or time of operation. There are three stages at which operation is relatively without risk—when the process is limited within the appendix, in the early stages of peritoneal involvement, and after local abscess formation. Early local peritonitis accompanying gangrene with or without perforation carried a mortality rate of 6.45 per cent in a group of ninety-three cases. It could be said that delayed operation in this group might transfer these cases to group 4, appendiceal abscess, in which operation was performed with one half the risk. But there seems no possible assurance that an early process will remain local or that, having become general, it will return to the status of a local process. In delaying surgical intervention in early peritonitis, as in our group 3 with a rate of 6.45 per cent, we have no preoperative basis for prophesying whether the transfer will be to group 4 with abscess formation and a mortality rate of 3⅓ per cent or to group 5 (that of general peritonitis) with a rate of 36.4 per cent. The only cases in which delay has been a part of the program are those presenting a palpable mass. Twelve of these were delayed from one to three days for preoperative preparation.

We would concede that a program of immediate surgery may have led to operation in cases of already long-established general peritonitis at a time when they represented an almost hopeless risk, which might have been lowered by temporary, supportive medical treatment. But by the same token we would refuse to delay operation in cases of early peritonitis on the basis that it will become a localized abscess. Too many factors of which one can have no preoperative knowledge are concerned. The location of the perforation in one case may be at the tip of a free appendix to be met early by a freely moving omentum; in the next case it may be in the base of an appendix in a field in which bands have fixed surrounding structures in such a position as to allow no mobility for the formation of barriers.

In the last four years we have chosen spinal anesthesia in the great majority of these acute cases. We have used the McBurney incision, which brings one immediately over the site of involvement, permits of no undue exposure or handling of viscera, lends itself to any necessary enlargement, and is best located for the purpose of drainage. As little manipulation of the intestine as possible is carried out and an attempt is always made to remove the appendix in the early cases.

We will take up first those cases in group 3, those with gangrene and local peritonitis, associated in most instances with early perforation. Operation in all cases in this group was carried out immediately after hospitalization, for reasons not so much concerned with the duration of the process but because the degree of spasm as opposed to distention was by far the predominating sign and because absorption and the resulting toxemia were not presenting a serious risk. Except in the presence of a beginning mass formation, we feel that removal of the appendix in this group and at this time is important and necessary in that it concerns the obliteration of the focal point of the process, which would continue only if the appendix was not removed. In only one in this group of ninety-three cases was the appendix allowed to remain. Although there may be but little fluid in the immediate region of such an appendix, it is often found that there is a considerable collection in the pelvis, and in all these cases drainage has been done with either a tube or a Penrose cigaret in the pelvis. Good care is taken that the omentum lies under this drain, which should not be in contact with or draining through loops of small bowel. A Penrose drain is placed on the stump of the appendix and a third one in the flank. The wound is closed in layers or with through-and-through sutures to the drains. The postoperative care is the same as in the case of general peritonitis and continues as long as necessary on that program, which will be discussed when we come to this group. We feel that delay in these cases with localized peritonitis, presenting as they do the possibility of progression of the peritoneal involvement, offers us but little opportunity of reducing our mortality in this group.

Incidence of Appendicitis in Five Groups

	Hospital			Dick Hall's House			Total		
	Cases	Deaths	Mortality Rate, per Cent	Cases	Deaths	Mortality Rate, per Cent	Cases	Deaths	Mortality Rate, per Cent
1.....	589	1	0.17	77	0	0	666	1	0.15
2.....	70	1	1.43	20	0	0	90	1	1.11
3.....	82	6	7.3	11	0	0	93	6	6.45
4.....	29	1	3.45	1	0	0	30	1	3.33
5.....	21	8	38.0	1	0	0	22	8	36.4
Total.....	791	17	2.15	110	0	0	901	17	1.89

This series includes thirty cases of appendiceal abscesses. We feel that these represent a process originally and permanently localized, and that they present no problems of peritonitis as such. In any cases in which there has been vomiting with resulting dehydration and a lowering of the general condition, any reasonable preoperative interval is allowable for the restoration of the patient to an acceptable operative condition. In several instances extraperitoneal drainage of the abscess has been possible, either with the primary incision into the mass at some point where it is in contact with the parietal peritoneum or by placing a pack on the unopened peritoneum at the point of closest contact of the mass with the parietes and then waiting for its spontaneous rupture.

When it has been necessary to drain by an incision through the abdominal wall, the appendix has been removed if reasonably accessible and if it could be delivered without the risk of too great dissemination of the infected material. In these cases we feel it imperative that a drain be left in the pelvis even though there may be no signs of involvement of that area at the time of operation, as it has been our experience that the occur-

rence of late pelvic abscesses is too frequent if the pelvis is not drained. The drainage in these cases has been carried out in the same manner as that already described. In this group of thirty cases, seventeen appendixes were removed at the time of the original operation and thirteen were drained without removal. We believe that the manipulation necessary to locate and separate these appendixes with the incidental bleeding and spread of infection is inadvisable and that simple drainage of the abscess is the proper procedure even though it necessitates a second operation. These patients are instructed to return in six months. Several failed to do so and two others returned only after a recurrent abscess had formed.

The twenty-two cases of perforated appendicitis with general peritonitis resulted in eight deaths, or a mortality of 36.4 per cent. Four of these cases represented practically hopeless surgical risks. This entire group is represented by that case which presents abdominal distention as the outstanding sign, less marked abdominal muscular spasm, dehydration, a weak rapid pulse, a pale, drawn expression, and, in some cases, a varying degree of cyanosis. Any preoperative interval in our hands has been short and for the purpose of intensive stimulation. Operation has been carried out in the same manner as in the earlier group. With no attempt at exploration, the appendix has been removed, if possible, which usually is the fact because of the absence of any localizing process. In only three of these cases was the appendix not removed. Drainage is carried out in the same manner as we have described, with the addition of counterdrainage on the left side in the presence of an excessive amount of fluid. The operative procedure is shortened as much as possible, and in this as well as in all cases with any considerable degree of peritoneal involvement no attempt is made at inversion of the appendix stump. These patients are put immediately into Fowler's position. We find it necessary to emphasize in our own institution that the patient be elevated with relation to the floor rather than to the bed. With the introduction of the Gatch type of bed there is no assurance that elevation of the bed means elevation of the patient with regard to the relative positions of the abdomen and the pelvis. These patients are left in Fowler's position for a minimum of forty-eight hours, after which exudative organization has probably occurred. Further maintenance of the position after this time is of little advantage, particularly when balanced against the discomfort of the patient and the difficulty of nursing procedures.

Morphine is continued every four hours in amounts sufficient to produce rest and quiet, the maintenance of a depressed respiratory rate being used as the control. We have found no substitute for morphine. The chewing of gum is started immediately and continued, as this seems the best manner of keeping in condition the mouths of the patients who are to be allowed no oral intake; it is probably of considerable value in preventing secondary parotitis, which may occur in the presence of dehydration. In any case in which a drain is placed in the pelvis and flank no drains are loosened earlier than the sixth postoperative day. It has been our routine procedure to start these patients on subcutaneous saline and dextrose solution intravenously. Subcutaneous administration is useless in cases showing much impairment of the circulation, and here the administration of fluids must be confined to the intravenous route. The period of continuance of intravenous or subcutaneous fluid administration and absolute restriction by mouth is of course determined by the developments. It is our feeling that warm liquids should be started as early as possible and rapidly followed by food requiring chewing, even though the food is not swallowed.

The problems in connection with these cases are associated, first, with the debility of the patient as a result of the absorption toxemia, and, secondly, with the intestinal obstruction resulting from the peritonitis with paralysis of the bowel or mechanical obstruction developing in the course of the organization of the peritonitis. We purposely avoid the use of the term "paralytic ileus" because of its multiple connotations. We would rather discuss paralytic obstruction accompanying peritonitis on the one hand and mechanical intestinal obstruction on the other, the first to indicate paralysis and the second a true mechanical intestinal obstruction.

The clinical differentiation is obviously difficult, but that patient who from the beginning lies in relative comfort, who insists on the constant presence of an emesis basin under the chin and regurgitates small amounts of fluid at frequent intervals, who maintains a uniform distention, whose abdomen on auscultation gives no sign of peristaltic activity, whose pulse and temperature continue rising and whose opinion of his condition improves as it becomes poorer, has, in our opinion, peritonitis with paralysis of the bowel. In these cases the stomach must be kept empty by an indwelling gastric tube or by intermittent lavage, and the support of intravenous and subcutaneous administration of fluids continued. During the development of this picture one resorts to enemas, intestinal motor stimulants, and stupes.

Mechanical intestinal obstruction as opposed to paralytic obstruction is late in onset, usually appearing between the sixth and tenth postoperative days with an onset marked by nausea and vomiting recurring in a patient who has already reached a point of relative recovery from the original early postoperative condition. The outstanding signs are a steadily rising pulse highly out of proportion to the temperature and with active visible or audible peristaltic activity. A mass may or may not be present. In this group we are confident that enterostomy is life saving, so we do a Witzel enterostomy as rapidly as reasonable. Under local infiltration of the upper left abdominal wall, through a short incision, entrance is made into the first loop of small bowel that presents itself, and the catheter is brought out through a free edge of omentum, which is left to lie directly under the abdominal wound. These patients can stand only the minimal surgical procedure of relief, and secondary exploration with direct attack on the seat of obstruction is too much surgery. One fatality in this group came from just that. No case in which an enterostomy was done required further surgery for the relief of the obstruction.

The differentiation between these two types of obstruction is apt to be more academic than clinically exact when applied to the individual case. If distention and vomiting are not relieved by stomach drainage, dextrose and salines, an enterostomy is to be considered. The general tendency is to postpone this procedure too long. Six of our patients had an enterostomy and a seventh a colostomy for the relief of obstructive symptoms. The colostomy patient survived; three of the six enterostomy patients lived. A fourth patient

lived twelve days following enterostomy, to die finally of a lung complication and to show at autopsy to have had practically no peritonitis remaining. The other three died of extensive peritonitis that was already present at the time of the enterostomy. It is generally recognized that the mechanical obstructive lesions due to local peritonitis are the best adapted for this procedure and that little can be expected from its use in general peritonitis with lack of peristalsis. Pelvic abscess that follows appendicitis with drainage, with its symptoms of rectal tenesmus, diarrhea, pain and fever, can be easily drained through the rectum in the male or the vagina in the female.

We have a certain number of patients each year who after having a stormy convalescence and a suppurating wound have been hastened to recovery by a secondary wound repair. This ordinarily is done between the seventeenth and the twenty-second day after operation and hastens wound healing remarkably. The skin edges are freshened, the muscles drawn together, and a firmer wound with less scar is obtained in a very short time.

CONCLUSION

We have presented a series of 901 cases including a controlled and an uncontrolled group on which is based a discussion of the management of perforated appendicitis of three types: one, gangrenous appendicitis with local peritonitis, associated in the majority of cases with early perforation; two, appendiceal abscess; and, three, perforation with general peritonitis.

This entire series has been managed on a program of operation immediately following an obvious or reasonably founded diagnosis of appendicitis. We are convinced that immediate operation in early peritonitis has aborted the transfer of some of these early cases to the group of diffuse and more long-standing peritonitis, which carries a considerable increase in mortality; that appendiceal abscess represents a lesion originally and throughout its duration restricted to a localized process by the morphology of the right lower abdomen of the individual and presents no emergent needs; and that late general peritonitis involves a mortality that is enormous. But excepting those cases which when first seen obviously present an entirely hopeless surgical risk, there will always remain in this group those cases concerning which it will be difficult to arrive at a decision regarding delay and preoperative treatment.

We have discussed our steps in management which we believe are so orthodox and to which so little addition can be made that improvement in mortality rate so far as we are concerned must come from the possibility of extending in the treatment of appendicitis in general those factors which are concerned in our group of controlled cases: early observation, early diagnosis and early operation. It is almost axiomatic that no item of health instruction in the public school system can offer greater possibilities in the saving of lives than a compaign concerning abdominal pain, laxatives and ice bags in their relation to peritonitis.

The Family Physician.—The family physician must be saved. Upon his salvation depends the future of the medical profession. This can be accomplished by improving his position in the community and providing him with more interesting and more remunerative work.—McFarlane, Andrew: The Family Physician—Past, Present, Future, *New York State J. Med.* **34**:579 (July 1) 1934.

THE TREATMENT OF PERITONITIS ASSOCIATED WITH APPENDICITIS

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In recent years it has become customary to begin articles on acute appendicitis with an apology. Since appendicitis is still the most common acute abdominal lesion, and since its etiology is unknown and its mortality rate is higher than it was fifteen years ago, it would seem that it is still worthy of thoughtful consideration. The mortality of appendicitis in the United States now averages over 20,000 a year. In a majority of these deaths the patients had been in the early decades of life with a good life expectancy.

In 1930, one of us [1] made a study of the patients with acute appendicitis treated in the University Hospital during a period of about four years. It was then our practice to perform an appendectomy as soon as the diagnosis of acute appendicitis was made without regard for the stage of the disease. As a result of that study, we found that the mortality was very low in those patients in whom the infection was limited to the appendix. It was also low in the patients in whom the infection was recent and limited to the right lower quadrant. These patients were largely those in whom the disease had lasted for two days or less. The mortality in patients with spreading peritonitis was shockingly high, and most of the patients of this group were found to have had the disease for from three to five days. An abscess was usually present. In cases in which the preoperative duration of the disease was longer than this, the mortality dropped quite remarkably. Every patient who died had had a purge of some sort, and it was clear that the purge had played an important part in increasing the severity of the disease. These observations confirm those of a large number of other surgeons who have made similar studies.

The vigorous campaign of Bower [2] and his associates in Philadelphia shows the good that can arise from a campaign directed toward the correction of the evils of late diagnosis, purgation and delayed hospitalization. However, the high mortality that is probably almost universal in this group of patients with general peritonitis has remained as a challenge to surgeons. The mortality in patients with diffusing peritonitis varies widely with different observers from 15 per cent to 65 per cent, with an approximate average of 28 per cent.

A review of the literature on the treatment of peritonitis is confusing and convinces one of the worthlessness of comparing statistics from different clinics in various parts of the world. They can be reconciled only by assuming geographic differences in the degree of severity of the disease. Since the mortality in our patients occurred mainly in patients with diffusing peritonitis and since an improvement in our results could be produced only by a change in the method of handling this group, we determined to treat all patients with acute

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1. Coller, F. A., and McRae, C. C.: Factors Influencing the Mortality in Acute Appendicitis, J. Michigan M. Soc. **30**: 319-328 (May) 1931.
2. Bower, J. O.: Acute Appendicitis in Philadelphia, Monthly Bull. of Dept. of Pub. Health of Philadelphia, December 1932.

appendicitis whom we suspected of having a spreading peritonitis by the method first advocated by Ochsner [3] in 1892.

In this paper we are reporting our experience of the past three years in treating all phases of acute appendicitis, with special reference to the use of deferred operation in patients with spreading peritonitis. We wish to make it perfectly clear that we advocate and practice immediate appendectomy for all patients in whom we believe the disease to be limited to the appendix or its immediate vicinity; we use the deferred operation only in cases of spreading peritonitis. We have applied the term "deferred operation" to the treatment advocated by Ochsner so as to emphasize its essentially surgical nature.

TABLE 1.—*General Analysis of Group of Patients Studied*

Type	No. of Cases	Deaths	Per Cent Deaths	Average Age	Duration of Disease Before Admission	Average Days in Hospital	Comment
Group 1. Acute appendicitis.....	213	1	0.46	18.2	22.5 hours	8.4	
Group 2. Peritonitis, deferred operation.....	85	8	9.3	17.5	3.1 days	19.9	
Group 3. Appendical abscess.....	35	2	5.7	26	10.1 days	22.7	
Group 4. Moribund on admission...	3	3	100.0	3	4 days	....	Died in 3 hours
Total.....	336	14	4.1				

A survey of the literature shows that the Ochsner treatment of suppurative peritonitis is used by the minority of surgeons; apparently the number of surgeons advocating the method is decreasing yearly. However, the reported results of its use by Guerry,[4] Deaver,[5] Sherren,[6] Love [7] and others are so good that we decided to give it a trial. In 1922, Jopson and Pfeiffer [8] discussed the method and summarized the literature, which showed a complete lack of accord among American and European surgeons as to their methods of handling patients with spreading peritonitis and with acute appendicitis.

We were disappointed in our search of the literature for detailed information concerning the method, as even the surgeons favoring it have given few details about the clinical course of patients treated by it. It seems to be a method for the treatment of a very serious disease that has proved its ability to give excellent results. We believe that treatment by deferred operation has been gradually losing ground, not through any fault of its own but because its value has not been sufficiently emphasized. The laudable desire of most authors to emphasize immediate operation for acute appendicitis has overshadowed discussion as to the best method of treating acute appendicitis complicated by spreading peritonitis.

This study was made on 336 patients admitted to the University Hospital during the three years from 1931 to 1933, inclusive. All these patients were proved to have had acute appendicitis by operation and examination of the appendix by the pathologist or, in some instances, by the clinical course of the disease. The patients can be divided roughly into two groups: 1. University students who were referred to us by the University Health Service, an ideal arrangement by which these young and otherwise healthy patients were seen by us early in the course of their disease; the results of treatment in this group were correspondingly good. 2. A group of patients who came to us from long distances relatively late in the course of their disease; among this group were many desperately sick patients.

A general analysis of the entire group of patients is shown in table 1. We have divided the patients roughly into groups according to the clinical manifestations and course of the disease and not according to the pathologic changes. The first group consists of cases of simple acute appendicitis in which we found the disease limited to the appendix or its immediate vicinity. In the second group, we found that the disease had spread beyond the appendix to the peritoneal cavity. Some of these patients were not operated on during the acute phase of the disease; they were treated according to the principles of deferred operation. A third group comprised patients entering the hospital in the late stage of the disease with a definite, palpable abscess. The fourth group consists of patients who were dying as they entered the hospital and are listed separately, as it is unfair to any method of treatment to include them.

The first group, listed under the heading of acute appendicitis, comprises 213 patients. In this group the disease had been present for an average of 22.5 hours. They were all operated on very soon after admission to the hospital. One patient died, the mortality rate being 0.46 per cent. Multiple hepatic abscesses developoped in this patient from infected thrombi in the vessels of the meso-appendix. The average stay in the hospital was 8.2 days. These results emphasize the importance of early diagnosis and operation while the disease is limited to the appendix. The second group in which we made a diagnosis of diffusing peritonitis will be discussed later in the paper.

TABLE 2.—*Analysis of Cases in Which Recovery Occurred with Deferred Operative Treatment*

Number of Cases, 77	Number	Per Cent	Preoperative Days	Total Hospital Days
Subsidence without operation.....	29	37.6	...	13
Development of localized abscess.....	48	62.4	9.3	25.1
Abscess treated by Appendectomy with drainage of abscess.....	32	41.5		
Drainage of abscess only	16	20.7		

The third group, comprising thirty-five patients, came for surgical treatment with a definite abscess and had been sick for an average of 10.1 days. The abscess was drained and the appendix removed when possible. Two patients died, a mortality rate of 5.7 per cent. One of these patients, a boy, aged 8 years, had a pulmonary abscess associated with an appendical abscess and died of a pneumococcic septicemia. A second boy, aged 16 years, was admitted with an enormous pelvic abscess which ruptured some hours before it was drained, causing death three days later. The average hospital stay was 22.7 days.

The fourth group consisted of three children, aged 3, 4 and 4; all were the victims of vigorous purging

3. Ochsner, A. J.: The Cause of Diffuse Peritonitis Complicating Appendicitis, and Its Prevention, Am. J. Surg. & Gynec. **15**: 84, 1902.
4. Guerry, LeGrand: A Study of the Mortality in Appendicitis, Ann. Surg. **84**: 283 (Aug.) 1926.
5. Deaver, J. B.: The Acute Abdomen, Med. Rec. **93**: 47-52 (Jan. 12) 1918.
6. Sherren, James: The Causation and Treatment of Appendicitis, Practitioner **74**: 833, 1905.
7. Love, R. J. M.: Some Acute Abdominal Disorders, Lancet **1**: 375 (Feb. 23) 1928.
8. Jopson, J. H., and Pfeiffer, D. B.: The Limitations of the Ochsner Treatment in Certain Cases of Suppurative Peritonitis, Ann. Surg. **77**: 194-205 (Feb.) 1923.

and had been sick for three days. They entered the hospital unconscious and pulseless. One died before she was examined, another died in one hour, and the other died in three hours. They are not included in any treatment group as no treatment could have been of any avail, but they are included in the total mortality figures. They died because the diagnosis had been made too late and because they had been purged.

DEFERRED OPERATIVE TREATMENT

The second group, which includes the patients with a spreading peritonitis, comprises eighty-five patients (25.3 per cent of the entire series) for whom the deferred operative treatment was carried out. These patients had had appendicitis for an average of three and one-tenth days before entering the hospital. Our rule for selecting patients for this type of treatment is as follows: Every patient entering the hospital with acute appendicitis of forty-eight hours' duration or longer was seen by a senior surgeon and the question of the stage of the disease and the type of treatment were carefully considered. If it was felt that the disease was limited to the appendix or its vicinity, an immediate operation was performed; but if it was felt that diffusing peritonitis was present, the deferred operative treatment was chosen. Any patient with appendicitis of less than forty-eight hours' duration in whom it was thought that peritonitis might be present was also seen by a senior surgeon. In short, the deferred operative treatment was undertaken only after consultation with careful individual consideration of the patients.

The history, signs and symptoms of diffusing peritonitis are usually typical. There are observed the hippocratic facies, dehydration from vomiting, fever varying in degree but often rising to 104 F., rapid pulse and respiration rates, restlessness and a rigid diffusely tender abdomen and a high leukocytosis. Many variations occur, however, and at times it taxes the most experienced surgeon to diagnose the exact stage of the disease. We have been pessimistic enough always to prophesy that conditions are worse than seems probable from the external evidence. Undoubtedly some of the patients in whom we made a diagnosis of diffusing peritonitis had only a localized peritonitis that later developed a walled-off abscess or recovered without its formation.

The treatment carried out is essentially that advocated by Ochsner [3] in 1892. The patient is put into a comfortable Fowler's position, heat is applied to the abdomen by an electrical pad or an electrical baker, and morphine is given in sufficient quantities to keep the patient free from pain and apprehension. The stomach is emptied by positive siphonage through a small indwelling duodenal tube introduced through the nose, and absolutely nothing is given by mouth. The urine and blood chemistry are studied. Physiologic solution of sodium chloride and 5 per cent dextrose solution are given alternately by continuous intravenous drip; at least 5,000 cc. is given daily to an adult; at least 1,500 cc. of urine should be secreted daily. No enemas are given and fluids are not administered by rectum. The gastro-intestinal tract is given as complete a rest as possible.

Usually within a few hours a favorable change is noted. The temperature and pulse rate fall, the vomiting ceases, the skin and tongue become moist and the abdomen becomes less rigid and tender. Distention of the abdomen, if present, often subsides, but it may or may not reappear. With the complete rest given to the gastro-intestinal tract, distention did not usually become a troublesome symptom. In no case was it felt obligatory to do an enterostomy; this is in marked contrast to our previous experience with the same type of case, in which immediate appendectomy had been performed and in which we performed an enterostomy almost as a routine.

The progress of a typical reaction to deferred operation is seen in chart 1. The patient had been sick for three days with a characteristic history of acute appendicitis prior to admission to the hospital. He was first seen with a higher fever, rapid pulse and respiratory rate and a leukocytosis of 19,000, with generalized abdominal rigidity and tenderness. The response to treatment was striking. There was remarkable improvement in the symptoms just cited and a

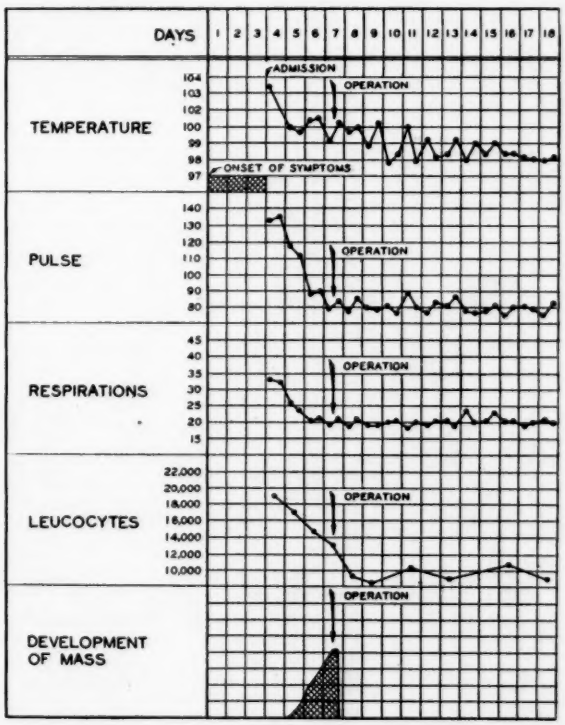

Chart 1.—Progress of a typical reaction to deferred operation. Onset of symptoms three days before admission. Appendectomy and drainage of abscess on fourth day in the hospital.

corresponding improvement in the clinical symptoms. An abscess was detected on the sixth day of the disease, or the third day of treatment, and was drained on the following day. Convalescence was uneventful and the patient was sent home after fifteen hospital days.

Frequent, at least daily, examinations of the pelvis and abdomen must be made in anticipation of the development of an abscess. The average time in which the abscess was noted was seven days after the onset of treatment. The results of treatment are shown in table 2. Of the eighty-five patients treated in this manner, eight died, a mortality of 9.4 per cent. Of the seventy-seven who survived, twenty-nine, or 37.6 per cent, grew steadily better; the signs of the disease disappeared, no abscesses developed and they were discharged home on an average of thirteen days. In spite of the fact that no demonstrable abscess was found and that in no instance did an abscess drain spontaneously through the bowel, we feel certain that a peritonitis of

some degree was present. These patients probably had a peritonitis of relatively mild virulence, or the infected area was more effectually walled off.

We direct these patients to return for appendectomy in eight weeks and the great majority of them have undergone an appendectomy at about that time. In most instances, there still exists at that time both gross and microscopic evidence of recent severe infection and perforation. In forty-eight patients an abscess developed and an operation was performed in an average of nine and three-tenths days after admission to the hospital, or on the twelfth day of the disease. In thirty-six patients the abscess was localized in the region of the appendix in the right lower quadrant of the abdomen. In nine patients the abscess uniformly filled the pelvis. In three patients the abscess was in a retrocecal or paracecal position and there existed an associated subphrenic abscess. Localization of the infection usually begins to be obvious on the sixth or seventh day after institution of the treatment and can usually be felt by abdominal, rectal or bimanual palpation. The presence of diarrhea is almost pathognomonic of the formation of a pelvic abscess. Frequent roentgen studies of the chest must be made for comparative study of the diaphragm in order to make an early diagnosis of subphrenic abscess, which must always be suspected.

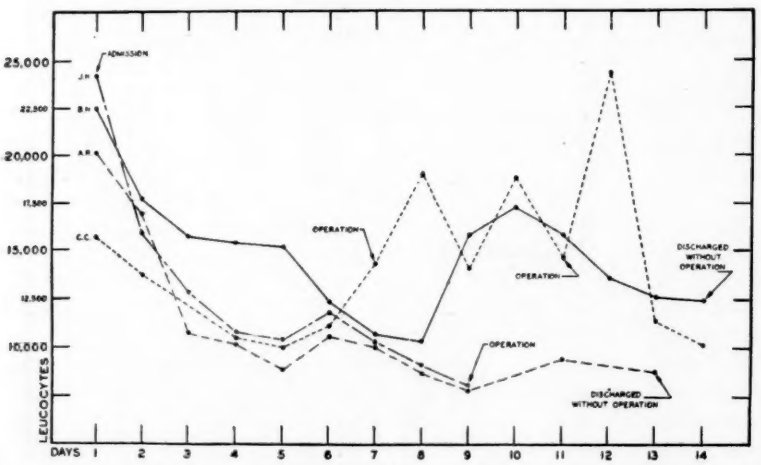

Chart 2.—Leukocytosis in four patients with general peritonitis treated by delayed operation.

The behavior of the leukocyte count is of some interest in connection with development of the abscess. The leukocyte count of four typical cases is shown in chart 2. As can be seen, there was a steady drop in the leukocyte count for the first six days, corresponding to the fall in temperature and pulse and with improvement in the patient's general condition. This reaction, which is almost constant, probably indicates the time at which the generalized infection is disappearing or is being localized. It is at this time that the presence of an abscess should be suspected. As the abscess develops, the leukocyte count again rises. The location of the incision used and the type of operation performed varied. The incision was always made over the presenting point of the abscess, and the appendix was removed in thirty-two cases at the time of drainage of the abscess. In sixteen patients the abscess was simply drained. The appendix was always removed if it was accessible and if it could be removed without breaking the wall of the abscess; otherwise it was left to be removed at a later date.

Eight patients died while undergoing the deferred operative treatment. A study of these is of interest and is shown in table 3. We feel that the first five patients were doomed with any form of treatment. Patient 1, a girl, aged 5 years, had the disease for ten days before hospitalization and was treated during this time for cystitis by forced fluids and bladder irrigations. She was dehydrated, profoundly septic and died four days after admission. Autopsy showed a diffuse general peritonitis. Patient 2, a boy, aged 8 years, entered the hospital with signs and symptoms of peritonitis. He was unconscious, had frequent convulsions and died on the fifth day of the disease. Autopsy showed him to have a well walled-off abscess in the right side of the pelvis but with a very large thymus and general evidence of a thymolymphatic constitution. Patient 3, a boy, aged 11 years, had received daily purges for a week and when first seen in the hospital was very septic and continued in a desperate state until death one week later. The autopsy showed a generalized peritonitis. Patient 4, a girl, aged 12 years, entered the hospital unconscious and had frequent convulsions until death. No localizing signs were present and the diagnosis was in doubt until the autopsy showed a generalized peritonitis. Patient 5, an obese woman, aged 55, worked in the field on a farm for five days with daily catharsis during the progress of the disease. She was profoundly septic and pulseless and died in two days.

The last three fatal cases offer a different problem, and we feel that these patients might have recovered if our handling of them had been more skilful. It will be noted that drainage of an abscess either was performed late or was inadequate, as shown by the necessity of redrainage. Edema of the external genitalia developed in all three of these patients, and at operation large abscesses under tremendous tension were found which were not detected earlier in spite of frequent abdominal and rectal examinations. Without being able to explain the exact mechanism of the production of the edema of the external genitalia, we have come to look on it as of great importance, signifying that there was a pelvic abscess under tension and probably one that had passed the optimal time for drainage.

In two cases recently, not included in the group of patients here under discussion, we have operated as soon as edema appeared, in spite of the fact that an abscess could not be palpated; in both instances abscesses were found and drained, and the patients recovered. Usually the presence of an abscess is easily detectable, but occasionally, as in the three fatal cases just mentioned, it may be a matter of great difficulty; the persistence of general signs of sepsis, abdominal pain, a rising leukocytosis and the presence of an abscess should lead to an assumption of the presence of an abscess, even though it cannot be definitely felt as a mass. Abscesses may be multiple and may require multiple drainage, although the formation of secondary abscesses is not as common in our experience in the patients treated by the Ochsner method as in those treated by immediate appendectomy and drainage. In the three cases mentioned in the preceding paragraph, drainage was instituted later than usual and all three

cases required redrainage. It is probable that had we been more alert and performed drainage earlier, the occurrence of the secondary abscess and reoperation might not have been necessary. The proper management of these patients requires the utmost vigilance and taxes the experience and judgment of the surgeon to the limit.

TABLE 3.—*Analysis of Patients Dying with Peritonitis Treated by Deferred Operation*

Name	Sex	Age	Duration of Disease, Days	Purge	Hospital Day of Death	Operation	Comment
Case 1 V. S.	♀	5	10	No	4th	No	Far advanced diffuse peritonitis; treated for cystitis before entrance
Case 2 W. F.	♂	8	2	Yes	3d	No	Abscess well walled off; unconscious; convulsions; thymolymphatic constitution
Case 3 E. M.	♂	11	7	Yes	7th	No	Far advanced generalized peritonitis
Case 4 H. M.	♀	12	2	Yes	2d	No	Unconscious; convulsions; septicemia
Case 5 E. S.	♀	55	6	Yes	2d	No	Farm work prior to hospitalization; general peritonitis
Case 6 J. D.	♂	9	2	No	24th		Pelvic abscess drained 15 days; subphrenic abscess 25 days; edema of scrotum
Case 7 M. T.	♀	15	1	Yes	27th		Subphrenic abscess 12 days; abscess redrained 25 days; retroperitoneal infection; jaundice; edema of labia
Case 8 C. C.	♂	16	3	Yes	21st		Pelvic abscess drained 7 days; pelvis redrained 22 days; edema of scrotum
Average.....			4.1				

As will be seen from our mortality table, most of the deaths occur in children. This opens the question of the applicability of the principle of deferred operation to them.

In table 4 is shown the mortality in the various clinical types of the disease as it occurs in the different age groups, with special reference to the young. The mortality in patients under 18 years was 6.3 per cent and in patients over 16 years it was 2.2 per cent.

In general it is true, as shown here, that the younger the child, the greater will be the mortality with any form of treatment. The disease is generally not recognized early because of the difficulty or impossibility of eliciting a history and because of the prevalent idea among mothers and some physicians that children are subject to abdominal pain of mysterious origin that can be cured only with a purge. The sooner the knowledge becomes widespread that infants and children are liable to the same organic diseases that affect adults, and that a child with abdominal pain is entitled to a physical examination before purging is done, the sooner will the child with appendicitis have the same chance of recovery as has the adult. All the children on whom we carried out the Ochsner treatment were much sicker than the members of the adult group. The mortality in children is high because of late diagnosis, home treatment with almost universal purging and, in addition, the anatomic and physiologic differences between young children and adults. The omentum, which plays such an important part in the defensive mechanism, is much less developed in children, and localization of infection is correspondingly less efficient and frequent. The young child tolerates the infection less well and his body chemistry is less stable than is that of the young adult.

The mortality of patients less than 16 years of age having general peritonitis and treated by this method was 12.5 per cent; this compares favorably with treatment by any other method and is better than our own results in this group treated by immediate operation. For the reasons we have enumerated, these patients are often in a desperate condition and offer the most difficult surgical problem in appendicitis. Without exception, we have treated them in exactly the same way as the adults, but they require infinitely more careful supervision and nursing care. Distention is much more common among children and is slower to subside. Although the deferred operative treatment is less efficient in children than in adults, any form of treatment is less efficient in children. We feel, therefore, that the principle of delayed operation should be applied to children with peritonitis. They so often come to the surgeon dehydrated and with acidosis; immediate operation only hastens an unfavorable outcome. By deferring operation even for a short time, the body fluids and body chemistry can be restored to normal, and they are then in a much better condition to withstand operation.

COMMENT

Surgeons have been urging early operation for acute appendicitis since it became recognized as a disease entity. There is no doubt of the soundness of this principle. We heartily subscribe to the dictum of immediate operation as soon as the diagnosis of acute appendicitis has been made. Also, we recommend operation in cases in which appendicitis is suspected; it is much better occasionally to remove an innocent appendix than to allow acute appendicitis to progress to its complications. However, to urge early operation for acute appendicitis is not the same as to urge immediate operation when the disease is no longer simple acute appendicitis but is complicated by a diffusing peritonitis.

TABLE 4.—*Analysis of Form of Disease and Results of Treatment in Various Age Groups*

	To 5 Years		6 to 10 Years		11 to 15 Years		16 Years and Over		Totals	
	Number	Deaths	Number	Deaths	Number	Deaths	Number	Deaths	Number	Deaths
Group 1. Acute appendicitis.....	30	0	25	0	40	0	118	1	213	1
Group 2. Delayed operation.....	5	1	13	2	30	3	37	2	85	8
Group 3. Abscess on admission.....	6	0	1	1	5	0	23	1	35	2
Group 4. Moribund on admission*.....	3	3	..	..	..	..	..	..	3	3
Total.....									336	14

* Death in three hours.

There exists a great diversity of opinion concerning the method of operative attack on patients with general peritonitis. Most surgeons advise removal of the appendix and drainage of the peritoneal cavity. Others advise removal of the appendix and closure of the peritoneum without drainage; thereafter the treatment is similar to the Ochsner method of treatment. Other surgeons simply drain the peritoneal cavity without removing the appendix; a very few surgeons still carry on an elaborate toilet of the peritoneal cavity with

wipings and irrigations. Jones[9] recently reported a very low mortality in this type of patient after treatment by appendectomy and cecostomy. Our own experience with all these methods has been limited but, such as it was, has not been satisfactory.

Any type of operation carried out on a patient with a spreading peritonitis on the third, fourth or fifth day of the disease reduces the patient's ability to combat the infection, at least on theoretical grounds, presumably because the operation traumatizes the peritoneum before immunity is established. It is highly desirable to remove the appendix in every case in which it is a local focus of infection; when, however, peritonitis has begun to spread, its diffusion no longer depends on the presence or absence of the appendix. Once peritonitis has begun to spread, the peritoneum and abdominal cavity develop greater protective and reparative powers when they are not traumatized by operation. We feel that in a certain group of patients the protective function of the peritoneum can be encouraged and utilized by deferring operation until the immunity of the peritoneum has become well established.

Like any other surgical procedure, deferred operation has very distinct limitations. In the first place, the diagnosis must be certain, and, if doubt exists as between appendicitis and some other lesion for which immediate operation is desirable, one must not defer operation. Under no circumstances do we defer operation in cases of appendicitis associated with pregnancy, since the presence of the enlarged uterus prevents localization of the infection; because of this fact, operation in the pregnant woman should be performed on suspicion of the presence of appendicitis. No rule can be arbitrarily laid down as to the type of patient who should be treated by the method of deferred operation. We have found that every patient must be considered individually and the type of treatment finally chosen after it has been determined to the best of one's clinical ability that a spreading peritonitis is present.

The principle of deferring operation implies that an operation will eventually be performed. It is often difficult to choose the optimal time for operation, and a mistake may be serious. There should be no delay in draining an abscess once its presence is noted, or even suspected, because an enlarging abscess may rupture and reinfect the free peritoneal cavity. If this occurs, the result is often fatal. Secondary abscess in other locations may develop if the original abscess remains undrained. Deferred operative treatment is in no sense medical treatment. It must be carried on in a hospital by a surgeon who is prepared to operate at any time that the indications become clear. Few surgical problems present greater difficulties with respect to decision as to the optimal time for operation. In case an abscess does not develop, or in case the abscess is drained without removal of the appendix, the patient must be instructed to return for an appendectomy in from eight to twelve weeks. Observation has shown that the acute peritoneal reaction has disappeared by this time, making the operation technically easy, and if the operation is postponed for a longer time other acute attacks may supervene.

After an experience of three years with deferred operative treatment, we feel that it has definite advantages over the other methods of treatment with which we are familiar and that it has a highly important place in reducing the mortality of peritonitis secondary to appendicitis.

9. Jones, E. S.: Appendectomy in Cases of Ruptured Appendix Associated with Diffuse General Peritonitis, Ann. Surg. **99**: 640-649 (April) 1934.

SUMMARY

A study has been made of 336 patients with acute appendicitis treated in the University Hospital. The mortality was 4.1 per cent. In 213 patients, the disease was limited to the appendix, and immediate appendectomy was performed with a mortality of 0.46 per cent. In thirty-five patients there was an abscess present on admission to the hospital and immediate operation was performed with a mortality of 5.7 per cent. In eighty-five patients the appendix had ruptured and a diagnosis was made of spreading peritonitis. These patients were treated according to the principle of deferred operation as advocated by Ochsner; the mortality was 9.3 per cent. Among the seventy-seven patients who survived, the disease subsided without operation in twenty-nine and an abscess developed in forty-eight. The abscess was drained, with simultaneous appendectomy, in thirty-two patients, and simple drainage without simultaneous appendectomy was done in sixteen patients.

CONCLUSION

The treatment by delayed operation has an important part in the management of the late stages of acute appendicitis complicated by general peritonitis. Its use should be limited to this group of patients.

ABSTRACT OF DISCUSSION

ON PAPERS OF DRS. GILE AND BOWLER AND DRS. COLLER AND POTTER

DR. ALTON OCHSNER, New Orleans: The measures emphasized by Drs. Coller and Potter are of the utmost importance: the absolute withholding of everything by mouth, allowing not even water, and the liberal use of morphine, not with the idea that it splints the bowel but because morphine, instead of inhibiting bowel activity, actually increases it. It doesn't increase peristalsis but it does increase the tone of the bowel. Patients with peritonitis do not die from the peritonitis as such. They die of their associated adynamic ileus, which can be largely prevented by increasing the tone of the intestine by liberal doses of morphine, and in this way the mortality rate from peritonitis can be definitely decreased. As every one knows, the mortality rate in appendicitis is increasing. My explanation of it is that these patients are coming into the hospital with a peritonitis, too late for the early operation and too early for the late operation, an axiom that was first sounded by Richardson. These patients should be treated conservatively by the use of heat to the abdomen, absolutely nothing by mouth, and large doses of morphine. As a result of the large doses of morphine, frequently their vital capacity is decreased. I try to combat the anoxemia by giving them oxygen. I feel that this is important. I agree with Drs. Coller and Potter that these patients should not be given enemas, because anything that will tend to increase the intestinal peristalsis will tend to break down the protective barrier, which is of such importance. I give nothing by rectum. Proctoclysis should not be given, because even though given slowly it tends to increase peristalsis, a condition that is not wanted. In my series the incidence of abscess formation has been less than in the series of Drs. Coller and Potter. Only about 30 per cent of my patients who have come in with a definite, palpable mass have developed abscesses. The explanation is that the mass which is palpable is an inflammatory one, consisting of the omentum and inflammatory exudate. This inflammatory process subsides without progressing to suppuration. In such cases the appendix should later be removed. In cases in which suppuration occurs it is important that incision and drainage be instituted as soon as suppuration has occurred.

DR. LE GRAND GUERRY, Columbia, S. C.: In 1,438 cases of recurrent appendicitis in my experience of more than thirty-two years there were no deaths. In 858 cases of acute appendicitis there was one death. This group includes the definite, acute cases of appendicitis up to the point of rupture. No case was included in this group in which there was gross perforation of the appendix. In the third group there were 484 cases of gangrenous, ruptured appendixes with three deaths. In a group of localized abscess cases of this size one would run the gamut of intraperitoneal suppuration. In group 4 there were ninety-four cases of gangrenous, ruptured appendixes with diffuse peritonitis. These patients were operated on immediately, with ten deaths, or a mortality of 10.64 per cent. In striking contrast to group 4 is group 5, with 135 cases of gangrenous, ruptured appendixes with diffuse peritonitis; there were two deaths, or a mortality of 1.4 per cent. The cases in this group were handled on the basis of deferred operation as given to me by Ochsner many years ago. My view is that the mortality rate in appendiceal surgery is largely determined by the way in which the cases in this critically ill group are handled, and that the principle of deferred operation is largely the solution of the problem. In a continuous, consecutive, unselected series of cases extending over a period of more than thirty years the mortality was around 0.5 per cent, a fact that in itself is most significant. I believe that to do a formal operation in this desperately ill group of patients is to invite disaster and an excessively high mortality rate. Deferred operation in the group of cases to which it is applicable should be regarded as the first step in the operative procedure and in no sense should be looked on as a means to evade operation. The whole force of the paper of Drs. Coller and Potter substantiates and proves the soundness of my contention. A separate group was made of ten cases in group 6, with three deaths, because the patients were moribund and they were the only ones in the entire series in which the appendix was not removed. The 423 cases in group 7, with one death, are presented to show the additional risk attached in removal of the appendix during the course of other operations. Only such appendixes are included in this group as gave unmistakable evidence of being diseased.

DR. C. F. DIXON, Rochester, Minn.: I feel that the total mortality rate in the experience recorded in both papers has been commendably low. I should like to reemphasize two points that were brought out: First, removal by an experienced surgeon of an acutely diseased, unruptured appendix is associated with practically no mortality rate; second, tragedies frequently occur when a patient with an acutely diseased appendix is given a cathartic. Careful study will show that the majority of patients who have ruptured appendixes, with general peritonitis, have taken some type of cathartic. Consequently it is this group of patients which gives the greatest concern. The report that Dr. Guerry published in 1926 is without question the finest that I know anything about. In it he reported from his personal experience 2,959 cases in which appendectomy had been performed in a period of twenty-five years, with a total mortality of 0.54 per cent. In 208 of these cases the appendix had perforated and diffuse peritonitis was present. In eighty-five of these 208 cases appendectomy was carried out immediately, with a mortality rate of 8 per cent. In the remaining 123 cases appendectomy was deferred for several days, with a mortality rate of only 1.6 per cent. Apparently it is the people of rural districts who succumb to peritonitis following perforated appendixes. It is possible that placing labels on cathartics dispensed, warning against their use in acute abdominal disorders, might help to lessen the perforations that occur in appendicitis. In a group of 523 patients on whom I operated consecutively because of acute appendicitis, 437 of the appendixes gave evidence of diffuse disease or gangrenous changes. In this series there were no deaths. In forty-eight cases the appendix had perforated, causing diffuse peritonitis, and abdominal drainage was instituted without an attempt to remove the appendix; there were five deaths, a mortality rate of 10.4 per cent. In the remaining thirty-eight cases localized abscess was present and extraperitoneal drainage was instituted, with a mortality rate of 7.7 per cent. After a review of the work of the authors who presented their papers today, as well as the work of Dr. Guerry, it would seem that removal of a perforated appendix in the presence of coexisting peritonitis is not indicated.

DR. R. J. BEHAN, Pittsburgh: The United States census reports state that the mortality from appendicitis was 9+ per hundred thousand of population in 1920 and it has gradually increased to 15+ per hundred thousand of population in 1932. How is this increasing mortality from appendicitis to be combated? An attempt to do so has been made by educating the public and the physicians to take cognizance of the early onset of pain in the right lower quadrant of the abdomen as possibly indicative of appendicitis and insistence that such patients be hurried to the proper person for diagnosis and treatment. The next consideration is, Is the virulence of appendicitis increasing? This is not known and if cases are worse probably nothing can be done about it. Therefore there remains the last part of that triad of possibilities, the correction of the inadequacy of treatment. Undoubtedly the treatment must be inadequate when the mortality is constantly increasing. I came here with well defined ideas in regard to certain forms of treatment. After listening to the authors I was a little in doubt, but nevertheless I think I should continue along the same way that I have been accustomed to do in the last six years. My mortality rate in forty-four cases of acute appendicitis associated with generalized diffuse peritonitis, from 1920 to 1928, was 50 per cent. In 1926 I gradually began to use alcohol inside the abdominal cavity. In 1930 it was used as a routine. My mortality has been reduced in fifty-four cases to three deaths, which is about 6 per cent. I have operated on every patient with diffuse suppurative peritonitis who entered my service, and by diffuse suppurative peritonitis I mean those cases in which when one opens the abdomen one finds free fluid (fibrinous exudate) present in the abdominal cavity, in some of them under such great tension that it oozes out of the incisional wound. I found Bacillus coli infection in about 31 per cent of these cases; in about 6 per cent I found a streptococcus (pure culture), and in the remaining cases I found a variety of organisms. The treatment that I give in these cases is about the same as is usually given in cases of peritonitis. The abdomen is rapidly opened under spinal anesthesia, a suction tube is placed inside the abdominal cavity, the pus is removed, and immediately I pour in alcohol and in a few minutes remove it by the suction apparatus. In one case in which there was a gangrenous appendix, with a necrosis of the cecum and with the abdomen diffused with the feces and the bowel contents, I used one gallon of alcohol in the intra-abdominal lavage. I have had no bad results. I found that they were absorbing the alcohol, and in tests of the blood I found that in one patient 50 mg. of alcohol per hundred cubic centimeters of blood was present.

DR. GEORGE A. HENDON, Louisville, Ky.: I think that the keynote for the treatment of peritonitis from whatever source should be a sustained continuity of effort. The problem of dehydration and starvation has been answered satisfactorily, both before and after operation, by a continuous process. The drainage of the intestinal canal should receive more consideration than it has. The drainage of the peritoneal cavity has engaged the most serious efforts for a long time. I think that, in the management of cases that have been described, enterostomy should be an essential ingredient of the program and not a subsequent incident. The plan that I use is to pass a drainage tube through the cecum at the situation of the appendix, through the ileocecal valve and a short distance into the ileum. I prefer to use the Pezzer catheter, because it has a bulbous extremity by which it is more readily maintained inside the intestine. There is another point, and that is the fact that there are serious blood dyscrasias to contend with. I have made routine blood examinations on these patients and have discovered invariably that there is a low calcium content, and by the administration of the calcium salts through venoclysis I have been able to raise the calcium content of the blood to

its normal figure and even beyond it. I have been impressed with the fact that the evidences of improvement almost invariably synchronize with the increase in the calcium. This is a point which I would like to have investigated from other sources in order that its importance may be estimated. The process of drainage from the upper end of the intestinal tract should also carry the ingredient of continuity, and the suction tube placed through the nose into the upper part of the intestinal tract should be so arranged that the drainage which follows does not have to be entrusted to the caprices of fortune; some effort in the way of a suction apparatus which works continuously and gently should be attached to insure the rapid and complete and continuous evacuation of the upper intestinal tract.

DR. F. F. LAWRENCE, Columbus, Ohio: That there has been an increase in the mortality of appendicitis in the past few years cannot be denied; that that increase is entirely due to the technic of handling the cases cannot be justly charged. The economic conditions of the last four or five years have operated in two ways: first, to urge the doctor to try to shorten hospital stay if possible or to avoid hospitalization if possible; the other, to handicap the patient so as to insist on avoiding hospitalization. Then there has been a reaction of public opinion to the oft repeated newspaper statements that every abdominal pain is considered an excuse for an appendectomy. The mortality and morbidity of appendicitis lies clearly in the delay in operating. Modern methods of training doctors in laboratory essentials and the failure to develop the use of the five senses have resulted in many delayed diagnoses and delayed operations, and consequently the patients frequently come to the surgeons moribund. The lack of benefits from the formerly called Ochsner treatment is due not to the method described by Dr. Ochsner but to its misuse. The attempt at the so-called fasting treatment for appendicitis, as Dr. Ochsner described it and as I have used it for thirty years most satisfactorily, does not permit the giving of medicine by mouth, does not permit the giving of even a teaspoonful of water by mouth, and it does not permit a distended stomach to remain so distended, but it means to empty the stomach with a stomach tube. There has been more or less swinging back to the idea that it is a crime to permit a poor human being to suffer a little bellyache, and consequently the use of morphine. There are three important reasons for the increased mortality: morphine, delayed diagnosis and operation, and misapplied Ochsner treatment. Of those three things which have to do with increasing the mortality, the delay in operation is the most important.

DR. FRED A. COLLER, Ann Arbor, Mich.: I am glad that Dr. Lawrence spoke, because I began to see the light only about three years ago. He has seen it for thirty years. The use of alcohol in the abdominal cavity is new to me. I have, however, seen a great many other chemicals poured in. I recall that at one time tincture of iodine was popular in the hands of some surgeons, and I recall that ether was commonly used for this purpose, especially by the French surgeons. I must say I would have a good deal of trepidation about pouring a large amount of alcohol into the abdomen, but Dr. Behan has done it and I have not, and his mortality figures are very low. I think Dr. Hendon is right to insist on fluids. We owe him a debt of gratitude for the method he has devised for the continuous intravenous administration, which we use in all cases. I am gratified that he believes in the siphonage treatment, that is, the inlying duodenal tube, which I have casually mentioned. It was hearing a paper by Dr. Guerry that convinced me I should try this method of treatment. I think no one has had the results in the treatment of peritonitis that Dr. Guerry has had. One can sum up the entire situation by saying that if we would no longer purge patients, if we would make our diagnosis early and insist on hospitalization and operation, this entire problem would be solved because we would have only appendicitis to treat and we would never get these cases of general peritonitis that we have been talking about today.

SODIUM FERROCYANIDE AS A CLINICAL TEST OF GLOMERULAR EFFICIENCY

PRELIMINARY REPORT

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Despite the almost innumerable tests of renal function that have been suggested, we feel justified in presenting a new procedure because of its distinct advantages. The essential criteria of a practical functional test of clinical value are: (1) simplicity, (2) safety, (3) specificity for the structures or functions studied, (4) creation of stress conditions, and (5) uniformity of normal results. These criteria are all fulfilled by sodium ferrocyanide, as here applied. The procedure and calculations are simple, the substance has proved entirely nontoxic, it places stress on the kidneys, for it is a substance foreign to the body, and the variation in excretion in normal persons is relatively slight.

Ferrocyanide salts have the unique characteristic that, so far as its known, they are excreted solely by the glomeruli. The work of Marshall [1] and Marshall and Grafflin [2] with the renal secretion in aglomerular fish revealed that ferrocyanide is not eliminated at all by these fish, or in but extremely minute traces. The more recent studies of Gersh and Stieglitz [3] with mammals convincingly demonstrate that ferrocyanide salts are eliminated by the glomeruli. There was no evidence whatever of tubular secretion. The rate of elimination appeared to be wholly independent of the rate of water excretion. It was because of these previous studies, indicating an extraordinary glomerular specificity, that we have attempted to apply this substance to clinical investigation of glomerular efficiency.

METHOD

Sodium ferrocyanide has been used in all instances. Potassium ferrocyanide is often toxic. The Abbott Laboratories generously prepared for us sterile ampules of dry sodium ferrocyanide containing 0.5 Gm. of the hydrated salt per ampule, or about 0.25 Gm. of the anhydrous salt. Extreme care is required in the preparation of these ampules, for the substance must be sterilized without heat, which tends to break down the ferrocyanide and liberate free cyanide ions. The Abbott Laboratories at first experienced difficulty because of spore-bearing organisms, but in using carefully synthesized sodium ferrocyanide this difficulty was overcome. Ferrocyanide salts may be decomposed by the acid of the stomach, if taken orally, but on slow intravenous injection of the sodium ferrocyanide no evidence of any toxic effect has been observed and none is to be anticipated.[4]

Our technic has been to dissolve completely the contents of one ampule (0.25 Gm. of the anhydrous salt) in 10 cc. of sterile distilled water and administer this by

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1. Marshall, E. K. Jr.: Am. J. Physiol. **94**: 1 (July) 1930.
2. Marshall, E. K. Jr., and Grafflin, A. L.: Bull. Johns Hopkins Hosp. **43**: 205 (Oct.) 1928.
3. Gersh, I., and Stieglitz, E. J.: Anat. Rec. **58**: 349 (March) 1934.
4. Sollmann, Torald: Personal communication to the authors.

slow intravenous injection. Following this, specimens of urine are collected and analyzed for their content of ferrocyanide. Various time intervals have been tried, but we have found that four specimens collected at 30, 60, 120 and 180 minutes after the injection yield the maximum of information.

The Titration.—The titration is carried out with a quantitative copper sulphate solution.[5] This is made to contain 0.4 per cent of copper sulphate (0.004 Gm. per cubic centimeter). The content of copper is determined exactly by electrolysis. Before titration the specimens are acidified with concentrated sulphuric acid. Copper ferrocyanide is an insoluble red salt but is less insoluble than the well known Prussian blue. This fact is used in determining the end point of the titration. Drops of concentrated ferric chloride solution are placed on a tile and as the titration proceeds a drop of the unknown solution is placed in contact with the ferric chloride. If free ferrocyanide is present an immediate formation of Prussian blue occurs; if all the ferrocyanide has been precipitated as cupric ferrocyanide, a distinct delay occurs in the appearance of this blue color on the tile. The more insoluble ferri-ferrocyanide slowly replaces the slightly more soluble cupric ferrocyanide. The end point is therefore read when the appearance of blue is delayed appreciably (five seconds), and the number of cubic centimeters of copper sulphate required is noted.

TABLE 1.—*Chemical Reaction*

Equation: $Na_4Fe(CN)_6 + 2\ CuSO_4 \rightarrow Cu_2Fe(CN)_6\downarrow + 2\ Na_2SO_4$

Molecular weight of $Na_4Fe(CN)_6$ = 304.08

Molecular weight of $CuSO_4 \times 2$ = 319.26

Therefore, $\frac{304.08}{319.26} = \frac{X}{0.004}$

$X = 0.0038$

Therefore, 1.0 cc. $CuSO_4$ precipitates exactly 0.0038 Gm. $Na_4Fe(CN)_6$

Example: Dose of $Na_4Fe(CN)_6$ = 0.25 Gm.

15 cc. of $CuSO_4$ used to reach end point

$0.0038 \times 15 = 0.057$ Gm. $Na_4Fe(CN)_6$

$\frac{0.057}{0.25}$ = 22.8% of total injected dose

Calculations.—The chemical reaction that occurs is represented in table 1.

If hematuria exists during the period of ferrocyanide elimination the method of titration must be modified, for the sulphuric acid apparently liberates sufficient ferric ions from the hemoglobin to precipitate Prussian blue and thus prevent the formation of the red cupric ferrocyanide. This difficulty is readily avoided by determining the volume of the specimen of urine, bringing it to a quick boil, which precipitates the protein, and then filtering it. A measured quantity of this filtrate is then acidified with concentrated sulphuric acid and titrated in the usual way, the results being corrected to the original volume of the specimen.

RESULTS

The majority of our observations were made in the medical service of Drs. L. C. Gatewood and A. A. Knight at Cook County Hospital. We have also studied the excretion curves of a number of healthy students. Our primary objectives in this preliminary investigation were to determine the degree of variation in excretion in the normal individual and to evaluate the excretion curves in two or three common disease states. In almost all instances the excretion of phenolsulphonphthalein [6] was also observed, the same time intervals being used as for the ferrocyanide excretion. Because of the crowded and hurried conditions at the Cook County Hospital, extensive control with other renal function tests, such as the urea clearance test and the Mosenthal test, was not undertaken.

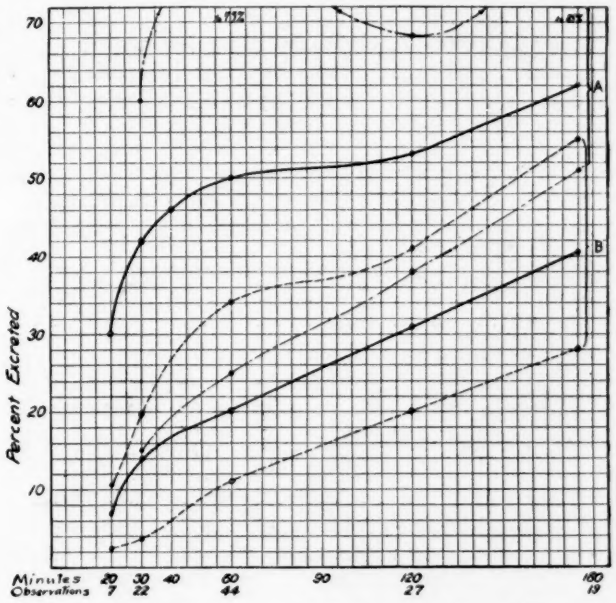

Chart 1.—Excretion curves for sodium ferrocyanide and phenolsulphonphthalein in fifty normal persons. Solid lines indicate averages, broken lines the extremes of variation: dashes for ferrocyanide and dots and dashes for phenolsulphonphthalein; *A*, phenolsulphonphthalein; *B*, sodium ferrocyanide.

Chart 1 reveals the average normal excretion curve of sodium ferrocyanide, as contrasted with the excretion curve of phenolsulphonphthalein, in fifty presumably normal individuals, the graph being recorded as percentage of the substance eliminated. The broken lines indicate the extreme degrees of variation noted. It is obvious that, although there is a moderate degree of individual variation in ferrocyanide elimination, this

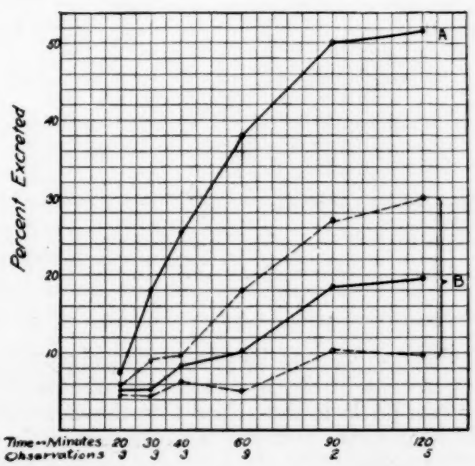

Chart 2.—Excretion curves for sodium ferrocyanide and phenolsulphonphthalein in eleven patients with hypertensive arterial disease but no urinary evidence of renal disease.

5. Sutton, Francis: A Systematic Handbook of Volumetric Analysis, ed. 10, Philadelphia, P. Blakiston's Son & Co., 1924, pp. 219-220.

6. Rountree, L. G., and Geraghty, J. T.: J. Pharmacol. & Exper. Therap. **1**: 597, 1909.

variation is distinctly less than that observed in the phenolsulphonphthalein excretion.

In eleven cases of hypertensive arterial disease with adequate cardiac efficiency and no urinary evidence of renal injury, the average excretion of phenolsulphonphthalein is slightly diminished under the normal average, but the ferrocyanide output is quite conspicuously reduced (chart 2). For example, at sixty minutes the normal phenolsulphonphthalein excretion was 50 per cent, and the average in the hypertensive patients 38 per cent (a fall of 24 per cent); with the ferrocyanide excretion the normal was 20 per cent at sixty minutes and 10.1 per cent in the hypertensive patients (a fall of 50 per cent). It is thus clear that the excretion of ferrocyanide is more sensitive to changes in the glomerular circulation. This is to be expected in view of the glomerular elimination of the ferrocyanide and the tubular secretion of the phenolsulphonphthalein.[7] It is thus evident that in the hypertensive patient the glomerular efficiency is notably impaired. This is contrary to the cenception[8] that arterial hypertension is a protective mechanism to insure an adequate and improved glomerular circulation. The recent studies of Goldblatt and his collaborators[9] in slowly clamping the renal artery and producing both marked hypertension and renal impairment are of great interest. Further studies of the ferrocyanide excretion in hypertensive disease are needed and are contemplated.

In eight cases of cardiac decompensation, both the ferrocyanide and the phenolsulphonphthalein excretion are much impaired; the former more so than the latter (chart 3). It is evident that impairment of renal circulation markedly affects the excretion of the salt. It has been claimed[10] that renal function is not impaired by cardiac decompensation; such a conclusion is invalid.

TABLE 2.—*Nephritic Cases*

	Time in Minutes					
	30	60	90	120	180	Clinical Data
Case 74; age 62	....	....	....	....	....	Chronic nephritis (azotemia); chronic cholecystitis with lithiasis; arterial tension 172/90; hemoglobin 90%; white blood cells 12,800; blood chemistry: urea nitrogen 130, sugar 100, creatinine 10.6
Ferrocyanide, per cent	....	5.9	....	7.7	8.5	
Phenolsulphonphthalein, per cent	....	Trace	....	Trace	1.0	
Case 75; age 58	....	....	....	....	....	Chronic nephritis; myocarditis; arthritis; arterial tension 170/90; hemoglobin 70%; red blood cells 4,000,000; white blood cells 5,150; blood chemistry: urea nitrogen 18
Ferrocyanide, per cent	12.4	....	20.0			
Phenolsulphonphthalein, per cent	....	40	45			
Case 76; age 16	....	....	....	....	....	Acute glomerular nephritis; rheumatic carditis; arterial tension 160/100; patient died
Ferrocyanide, per cent						
2/14/34	4.1	8.8	11.2			
3/15/34	4.7	7.0				
Phenolsulphonphthalein, per cent						
2/12/34	13	23	31			
3/15/34	10	..	25			
Case 78; age 63	....	....	....	....	....	Nephrosclerosis; arterial tension 160/90; hemoglobin 55%; blood chemistry: urea nitrogen 28.5, creatinine 1.95
Ferrocyanide, per cent	1.2	1.2	....	1.2	1.2	
Phenolsulphonphthalein, per cent	5	30	....	35	36	
Case 79; age 52	....	....	....	....	....	Nephritis; syphilitic aortitis; arteriosclerosis; arterial tension 206/110
Ferrocyanide, per cent	1.2	8.3	....	15.4	20.2	
Phenolsulphonphthalein, per cent	25	50	....	65	65	
Case 90; age 51	....	....	....	....	....	Chronic nephritis; chronic myocarditis; arterial tension 220/160
Ferrocyanide, per cent	5.9	17.7	....	29.5		
Phenolsulphonphthalein, per cent	35	60	....	70	75	
Case 87; age 39	....	....	....	....	....	Eclampsia 3 months previously; nephritis of pregnancy (type C); cardiac failure; arterial tension 190/110; hemoglobin 60%; red blood cells 3,000,000; blood chemistry: urea nitrogen 15.8, cholesterol 170
Ferrocyanide, per cent	10.0	15.3	18.9			
Phenolsulphonphthalein, per cent	40	50	55			
Case 94; age 17	....	....	....	....	....	Glomerulonephritis; nephrotic edema; arterial tension 162/110, 178/110; hemoglobin 75%; red blood cells 4,460,000; white blood cells 8,600; blood chemistry: urea nitrogen 26.6, chlorides 333, albumin 2.22%, globulin 2.91%, uric acid 4.2, creatinine 1.4, nonprotein nitrogen 45.4; patient died
Ferrocyanide, per cent	....	....	....	....	21.3	
Phenolsulphonphthalein, per cent	....	20	....	25	25	
Case 77; age 46	....	....	....	....	....	Chronic nephritis; myocarditis; arterial tension 156/98; hemoglobin 70%; white blood cells 11,800; blood chemistry: urea nitrogen 125
Ferrocyanide, per cent			No return			
Phenolsulphonphthalein, per cent			No return			
Case 91; age 44	....	....	....	....	....	Chronic nephritis; hypertensive heart disease; obesity; arterial tension 255/160; blood chemistry: urea nitrogen 98, creatinine 8, Sugar 76
Ferrocyanide, per cent	1.2	Trace				
Phenolsulphonphthalein, per cent			No return			
Case 93; age 58	....	....	....	....	....	Chronic nephritis (uremic coma); syphilitic aortitis; arterial tension 250/170; hemoglobin 55%; white blood cells 7,700; blood chemistry: urea nitrogen 47.5, creatinine 2.66, carbon dioxide 50 vol. per cent
Ferrocyanide, per cent			No return			
Phenolsulphonphthalein, per cent			No return			
Case 71; age 34	....	....	....	....	....	Chronic glomerular nephritis; anemia; arterial tension 190/120; hemoglobin 26%; red blood cells 1,420,000; white blood cells 7,100; patient died
Ferrocyanide, per cent			No return			
Phenolsulphonphthalein, per cent			No return			
Case 72; age 46	....	....	....	....	....	Chronic nephritis (uremia); mitral regurgitation; cardiac decompensation; arterial tension 156/98; hemoglobin 70%; white blood cells 11,800
Ferrocyanide, per cent			No return			
Phenolsulphonphthalein, per cent			No return			
Case 73; age 55	....	....	....	....	....	Chronic nephritis (uremia); hematemesis; arterial tension 160/98; hemoglobin 70%; white blood cells 19,950
Ferrocyanide, per cent	....	0.9	....	1.8		
			No return (later)			
Phenolsulphonphthalein, per cent	....	....	....	5		
			No return (later)			

The results obtained in fourteen cases of distinct nephritis are best presented in tabular form (table 2). In seven cases none of the injected ferrocyanide could be reclaimed in the urine. In the others, the excretion was most severely impaired. In one instance of glomerulonephritis in a young girl, a distinct increase in the impairment was detectable over a period of one month (case 76). Unfortunately, during our period of study, we have seen no case of true nephrosis.

COMMENT

Sodium ferrocyanide offers a number of distinct advantages over other test substances for renal functional studies. It has previously been experimentally

7. Potter, A. C., and Bell, E. T.: Am. J. M. Sc. **149**: 236, 1915.
8. Wiggers, C. J.: Ann. Int. Med. **6**: 12 (July) 1932.
9. Goldblatt, Harry; Lynch, James; Hanzal, R. F., and Summerville, W. W.: J. Exper. Med. **59**: 347 (March) 1934.
10. Brems, A., and Nielson, E.: Bibliot. f. laeger **125**: 266 (July) 1933.

demonstrated that ferrocyanide salts are excreted wholly by the renal glomeruli,[11] whereas phenolsulphonphthalein is excreted by the convoluted tubules, as are ferric salts.[12] Uric acid is largely, if not solely, removed by the glomeruli.[13] The routes of renal secretion of urea and creatinine are still somewhat uncertain. Urea is probably secreted by the convoluted tubules,[14] and there is evidence, as yet not fully convincing, that creatinine is eliminated by way of the glomeruli.[15] If this is true, further studies should reveal a very close parallelism between ferrocyanide excretion and the creatinine clearance test.[16] Lassen and Husfeldt[17] have very recently reported that in normal young men a fall in arterial tension induced by spinal anesthesia greatly decreased the glomerular filtration, although the tubular concentration was unimpaired. In acute hypotension to levels below the osmotic pressure of the blood colloids, ferrocyanide excretion ceases in rabbits.[3] Although it has been shown that in hypertension the blood flow through the kidneys is more rapid than normal,[18] the total glomerular efficiency is diminished. This may be attributed to the fact that injury to the glomeruli interferes with filtration more than with the free flow of blood.[19]

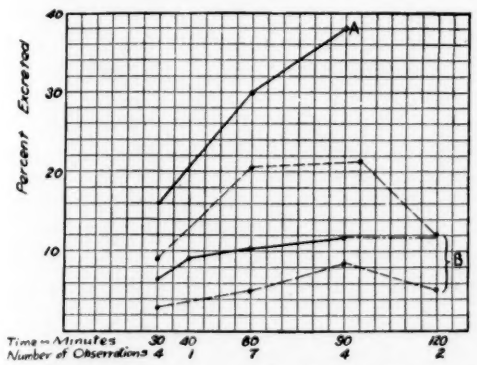

Chart 3.—Excretion curves for sodium ferrocyanide and phenolsulphonphthalein in eight patients with congestive cardiac failure.

We cannot discuss here the involved problems of the mechanism of renal secretion and the relation of this mechanism to the state of the circulation, but we feel that it is justifiable to point out that the ferrocyanide test offers a somewhat new and most promising method of approach to some of these problems. It is notable that in hypertensive arterial disease this glomerular function test reveals more extensive impairment than does the phenolsulphonphthalein test. Hypertension appears to diminish rather than enhance glomerular function, at least when the diastolic tension is raised through arteriolar hypertonia.[20] In one instance of aortic regurgitation with a huge pulse pressure (arterial tension of 220 systolic and 40 diastolic) the excretion of ferrocyanide was considerably increased over the normal: 38.9 per cent at sixty minutes and 50.7 per cent at 120 minutes. Although it is impossible to draw any conclusions from this single instance, it is an interesting observation and suggests further study.

The spread of variation in excretion of ferrocyanide is less than that observed with phenolsulphonphthalein. This is of considerable importance, for uniformity of the normal response is a vital criterion of an effective functional test. Fractional readings at 30, 60, 120 and 180 minutes reveal delay in excretion, as they do with phenolsulphonphthalein,[21] and are therefore more significant than the total output after three hours.[22] The secretion of phenolsulphonphthalein is notably affected by diuresis and also by hepatic injury,[23] whereas our previous experimental work revealed essentially identical elimination of ferrocyanide in dehydrated animals and in those in which a water diuresis was induced.[3] The renal concentration tests are probably the best guides to tubular efficiency,[24] but the ferrocyanide test reveals glomerular impairment.

CONCLUSIONS

1. Sodium ferrocyanide, in doses of 0.5 Gm. of the hydrated salt (0.25 Gm. of anhydrous sodium ferrocyanide) has been used in more than 100 individuals for the purpose of studying the glomerular efficiency.

2. It has proved entirely nontoxic in this dosage, when slowly administered intravenously.

3. The normal secretion curve is characteristic and shows but relatively little spread of variation. This variation is less than that of phenolsulphonphthalein excretion.

4. So far as is known, ferrocyanide salts are excreted solely by way of the glomeruli.

5. In hypertensive arterial disease the excretion of ferrocyanide is considerably retarded, much more so than the phenolsulphonphthalein elimination.

6. In congestive heart failure both the phenolsulphonphthalein and the ferrocyanide elimination are impaired.

7. In known glomerulonephritis the excretion of sodium ferrocyanide is either nil in severe cases or else very much reduced.

8. This test offers notable potentialities of clinical usefulness, since it is specific for the glomeruli, is safe, is simple of execution, and is quite constant in the normal.

9. In physiologic investigations of the mechanism of renal secretion the procedure should also prove of considerable value.

10. Much further work is required before the full significance and import of these studies are understood. We hope that this preliminary report may encourage others to extend and amplify this work; it has been our object merely to present a new method and to point out some of its potentialities.

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ABSTRACT OF DISCUSSION

DR. EDWARD J. STIEGLITZ, Chicago: The idea of this procedure started as a result of experimental work, which convincingly demonstrated that this substance, and this applies to

11. Marshall,[1] Marshall and Grafflin,[2] Gersh and Stieglitz.[3]
12. Stieglitz, E. J.: Am. J. Anat. **29:** 33 (May) 1921.
13. Gersh, I.: Anat. Rec. **58:** 369 (March) 1934.
14. Oliver, J.: J. Exper. Med. **23:** 30 (March) 1916.
15. McKay, E. M., and Cockrill, J. R.: Am. J. Physiol. **94:** 220 (July) 1930.
16. McKay and Cockrill.[15] Rehberg, P. B.: Hospitalstid. **71:** 1113 (Oct. 11) 1928; Zentralbl. f. inn. Med. **50:** 367 (April 13) 1929.
17. Lassen, H. C. A., and Husfeldt, Eric: J. Clin. Investigation **13:** 263 (March) 1934.
18. McKay and Cockrill.[15] Rehberg.[16] Ozaki, M.: Arch. f. exper. Path. u. Pharmakol. **123:** 305, 1927. Moritomo, M.: Arch. f. d. ges. Physiol. **221:** 155, 1928. Medes, Grace; Herrick, J. F., and Baldes, E. J.: Proc. Staff Meet., Mayo Clin. **7:** 549 (Sept. 21) 1932.
19. Weiss, Soma; Parker, Frederic Jr., and Robb., G. P.: Ann. Int. Med. **6:** 1599 (June) 1933.
20. Stieglitz, E. J.: Arterial Hypertension, New York, Paul B. Hoeber, Inc., 1930.
21. Chapman, E. M., and Halsted, J. A.: Am. J. M. Sc. **186:** 223 (Aug.) 1933.
22. Ellis, L. B., and Weiss, Soma: Am. J. M. Sc. **186:** 233 (Aug.) 1933.
23. Hanner, J. P., and Whipple, G. H.: Elimination of Phenolsulphonphthalein by Kidney, Arch. Int. Med. **48:** 598 (Oct.) 1931.
24. Stieglitz.[20] Fishberg, A. M.: Hypertension and Nephritis, ed. 2, Philadelphia, Lea & Febiger, 1934.

W. W.: J. Exper. Med. 59: 347 (March) 1934.

other ferrocyanides, such as potassium, magnesium and calcium, is excreted entirely through the glomeruli, the tubules having nothing to do with the secretion. As far as I know, it is the only substance in which this has been proved. Perhaps the most interesting implications of these clinical applications are the physiologic. After all, this is a section on physiology and pathology, so the physiologic implications warrant emphasis. That observation in a patient with a large pulse pressure in aortic regurgitation of an excretion of almost twice the normal amount at stated time intervals, I think, makes one stop and think with regard to the mechanism of glomerular activity. There has been a good deal of argument as to whether hypertensive disease is or is not a protective mechanism. It has been claimed by some that in the hypertensive patient a definite elevation of blood pressure is required to maintain an adequate renal circulation. I myself am convinced, not from this alone but from other observations, that that is an entirely erroneous conception, that the renal circulation and the renal efficiency are markedly impaired during the hypertensive state. With a lower blood pressure in the same individual there is better and more effective circulation, better and more effective function. As yet we have not made any extensive observations sufficient to warrant reporting on the ferrocyanide function of the secretion prior to therapy in hypertension and after reduction of the arterial tension. We feel that that warrants energetic study. Apparently, from these preliminary studies, it is the diastolic hypertension which apparently impedes glomerular efficiency rather than the systolic. We have here, in my opinion, a tool with which to carry out such investigation.

THE ADRENAL CORTICAL HORMONE

EXPERIMENTS WITH A COMMERCIAL ADRENAL EXTRACT (ESCHATIN)

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The relatively large number of articles concerning the adrenal[1] "cortical hormone" that have been published during the past five or six years may lead clinicians to believe that such a hormone has been actually isolated and is available as an effective remedy for treatment of Addison's disease, so-called hypo-adrenalism, and a number of conditions that have no known relationship to the adrenal glands. I am impressed with the lack of proportion between the volume of literature on the subject and the substantial experimental work that it represents. Crude extracts, the composition of which is not known and which contain substances other than the indispensable product of the adrenal cortex, have been extensively used in various experiments from which deductions of far reaching physiologic and clinical significance have been readily made. Reports have been published on alleged remarkable beneficial influence of such extracts in the treatment of Addison's disease and a number of other diseases. Recently, a large commercial manufacturing drug firm has marketed, for general distribution as a therapeutic agent, a product represented as a physiologically tested extract of the adrenal cortex. The experimental tests to be reported in the present communication are concerned with this extract (Eschatin, Parke, Davis & Co.).

Experience gained from many years of constant research on the adrenal glands leads me to the belief that, in the recent apparent race for priority of publication or scientific achievement the goal has been overreached. Conservative physiologists and physicians will readily agree that critical analysis of the accumulated literature reveals little or no substantial progress beyond the basic fact, which was conclusively demonstrated for the first time about nine years ago by the late G. N. Stewart and myself, that the adrenal cortex stores an indispensable hormone which is present in certain extracts made from the gland and which, when administered to completely adrenalectomized animals, is capable of materially prolonging life and ameliorating symptoms of adrenal cortical insufficiency. The adrenal cortical hormone has not yet been isolated in pure form. Nor is it always possible to obtain it free from undesirable, sometimes injurious, substances in extracts made from the gland. It may therefore be considered rather premature to produce such extracts commercially, for general distribution, to be employed by parenteral administration to human beings.

Demonstration of adrenalectomized animals, some of which were benefited by administration of cortical extract, was given by Rogoff and Stewart in 1925, during meetings of the American Physiological Society. A preliminary report was published in 1927.[2] Further reports were made at the meeting of the American Physiological Society in 1928 and at the thirteenth International Physiological Congress, held in Boston in 1929. It was announced that active material could be extracted by various lipoid solvents, including alcohol, acetone, petroleum ether, benzene and ether, and by selective use of combinations of these. The statement was repeatedly made that the most active preparations were obtained by initial extraction with alcohol and that the final product can be obtained in aqueous solution. Since 1926, numerous publications have appeared in various journals reporting similar results.

Shortly after Stewart and I demonstrated the beneficial influence of adrenal cortical extracts on the survival of adrenalectomized dogs, Hartman and his collaborators[3] reported the preparation of an alleged potent extract by means of salt precipitation. We were unable to interpret their results as demonstrating potency of their extracts. A number of years previously we had made unsuccessful attempts to "salt out" the active material from extracts of the adrenal. However, since Hartman and his associates recommend isoelectric precipitation, which was not included in our earlier attempts, we carefully repeated the experiments under the conditions described by these workers. We were unable to obtain products that were capable of prolonging life in adrenalectomized animals beyond the maximum survivals of our untreated control animals.[4] After Swingle and Pfiffner[5] published results that confirmed the reports by us that the active material of the adrenal cortex can be obtained by extraction with lipoid solvents, Hartman discarded his salt precipitation method and has since then employed lipoid solvents in the preparation of adrenal extracts.

1. The name "suprarenal" is appropriate only when referring to the gland in human beings and, perhaps, monkeys. In laboratory animals "adrenal" designates, more correctly, these organs. Since the name adrenal may also be properly employed in cases in which the gland rests above the kidney, I have preferred to use it, throughout this article, instead of suprarenal.

2. Rogoff, J. M., and Stewart, G. N.: The Influence of Adrenal Extracts on the Survival Period of Adrenalectomized Dogs, Science **66**: 327 (Oct. 7) 1927.

3. Hartman, F. A.; Brownell, K. A.; Hartman, W. E.; Dean, G. A., and MacArthur, C. G.: The Hormone of the Adrenal Cortex, Am. J. Physiol. **86**: 353 (Sept.) 1928.

4. Stewart, G. N., and Rogoff, J. M.: Studies on Adrenal Insufficiency: IX. The Influence of Extracts of Adrenal Cortex (Sheep and Cattle) on the Survival Period of Adrenalectomized Dogs and Cats, Am. J. Physiol. **91**: 254 (Dec.) 1929.

5. Swingle, W. W., and Pfiffner, J. J.: Studies on the Adrenal Cortex: I. The Effect of a Lipid Fraction upon the Life-Span of Adrenalectomized Cats, Am. J. Physiol. **96**: 153 (Jan.) 1931; II. An Aqueous Extract of the Adrenal Cortex Which Maintains the Life of Bilaterally Adrenalectomized Cats, ibid., p. 164. Pfiffner, J. J., and Swingle, W. W.: III. The Revival of Cats Prostrate from Adrenal Insufficiency with an Aqueous Extract of the Cortex, p. 180.

In the preparation of extracts by Swingle and Pfiffner and by Hartman and his co-workers, they employed very much larger amounts of gland substance per unit of final product than was employed by us. They also administered much larger doses of their products in their experimental work. Since we sometimes observed toxic action as well as beneficial influence of some extracts, it appeared probable that their practice might be disadvantageous. From a practical therapeutic standpoint their procedure presents the serious question of adequate supply of glandular material. According to their published reports it may often require up to 2 Kg. or more of adrenal glands per day to treat a single patient. Since we were able to obtain effective preparations by using much smaller amounts of gland material, it seemed desirable to make some comparative tests under our laboratory conditions and standards. It was not possible, however, to obtain their extracts for this purpose.

In our earlier experiments, dosage was arbitrarily determined on the tentative assumption that "interrenalin," the indispensable hormone of the interrenal gland (adrenal cortex), is probably liberated at a rate comparable with the rate of secretion of epinephrine from the chromaffin body (adrenal medulla). On this basis the amount of cortical hormone required each day for a cat of average size and in relation to the amount of epinephrine stored in the medulla would be present in an extract corresponding to approximately the amount of cortex representing 1 Gm. of whole adrenal. Since administration of extracts was made only once or twice daily and since not all the hormone may be expected to have been extracted from the cortex, our extracts were made to contain from two to three times the aforementioned theoretical value, and the actual dosage averaged approximately 1 Gm. of cortex per kilogram of body weight daily for completely adrenalectomized animals. Doses representing considerably less cortex were found effective in prolonging life in some dogs. At first, concentration of the extracts was employed so that 1 cc. was equal to 1 Gm. of cortex. Later, when we discovered the beneficial value of administration of physiologic liquids in adrenalectomized animals, some extracts were made so that 1 Gm. of adrenal cortex was contained in 10 cc. of extract. This permitted obtaining the combined effects of the cortical hormone and physiologic solution of sodium chloride, proving more effective in ameliorating symptoms and prolonging life. Indeed, this was the basis of the treatment of Addison's disease in my published report.[6] However, the relatively crude extracts were not always obtained entirely free from undesirable impurities and occasionally yielded toxic manifestations when introduced parenterally. As repeatedly stated, this convinced me that until a product of known purity can be obtained readily it is dangerous to employ the extracts at present available by parenteral administration, especially by the intravenous route in human beings. Accordingly, I modified the process so that the final product is preserved in glycerin, for oral administration in adequate dosage. Thus far it is evident that not only is the use of this product free from the dangers of parenteral administration but it has proved to be decidedly more effective by mouth in the treatment of Addison's disease[6] than was found by others who employed their extracts parenterally. In reference to parenteral, especially intravenous, administration of available cortical extracts, it is pertinent to quote the following from the report of a special committee of the Council on Pharmacy and Chemistry of the American Medical Association:[7]

> While recognizing and urging the value of intravenous therapy under appropriate conditions, it is equally important to emphasize the fact that the injection of any foreign substance directly into the human blood stream is always a serious undertaking. There are many conditions in which the risks inherent in intravenous therapy may greatly outweigh the real or supposed advantages which are claimed for the procedure. This is particularly likely to be the case with the more or less potent drugs. There is also a growing tendency on the part of many to resort to intravenous injection under conditions in which it is of dubious value, if not potentially harmful.

Since the Swingle and Pfiffner product has become available commercially, I obtained a sufficient supply, on the market, for a preliminary series of tests. A more extensive series of experiments was rendered impossible by conditions beyond my control. Nor was it possible at this time to undertake to repeat in detail some of the work reported by Swingle and Pfiffner. Two lots of Eschatin were purchased, one bearing the number 2984309 and the other 2989478. The physiologic criterion for potency of an adrenal cortical extract, established as the standard in our laboratory, is its capacity to prolong life of completely adrenalectomized animals beyond the maximum found in a large series of untreated adrenalectomized control animals. Since there is no essential difference between the process employed by Swingle and Pfiffner and that employed by us, except in the quantity of adrenal cortex represented in a cubic centimeter, some tests were made to determine the efficacy of Eschatin in prolonging life of adrenalectomized cats when the extract was administered in doses comparable with the maximum dose found adequate to prolong life in the experiments of Rogoff and Stewart. Other experiments were performed to test the value of Eschatin in relieving the symptoms of acute adrenal insufficiency, employing large doses, comparable with those used by Pfiffner and Swingle in their report on the revival of cats prostrate from adrenal insufficiency.[5] In the first case the Eschatin was so diluted with physiologic solution of sodium chloride so that 1 cc. was equal to 3 Gm. of cortex, based on the statement of the manufacturer that each cubic centimeter of their product represents 30 Gm. of cortex (i. e., 1:10 dilution). This was administered in doses of from 1 cc. to 1.5 cc. daily in cats following adrenalectomy. No evidence of prolongation of life was obtained in those animals that received the extract daily nor was there any evidence of revival from prostration or improvement from acute manifestations of adrenal insufficiency when large dosage was administered after the onset of symptoms. In more than one animal there was evidence of toxic influence of the material. The results of these experiments are illustrated in the following condensed protocols:

CAT 1.—Female, weight 2.5 Kg. Left adrenal excised Dec. 1, 1932. Right adrenal excised Jan. 17, 1933. Intravenous injection of 1 cc. (= 3 Gm. cortex) Eschatin daily beginning January 18. The animal progressively declined and was found dead on the morning of January 22.

6. Rogoff, J. M.: Clinical and Experimental Studies on Adrenal Insufficiency and Addison's Disease and the Treatment of Such Conditions by Interrenalin, Proc. California Acad. Med., 1930, p. 7; Diagnosis and Treatment of Addison's Disease, Canadian M. A. J. **24**: 43 (Jan.) 1931; Addison's Disease: Further Report on Treatment with "Interrenalin" (Adrenal Cortical Extract), J. A. M. A. **99**: 1309 (Oct. 15) 1932.

7. Hunt, Reid; McCann, W. S.; Rowntree, L. G.; Voegtlin, Carl, and Eggleston, Cary: The Status of Intravenous Therapy, J. A. M. A. **88**: 1798 (June 4) 1927.

CAT 2.—Female, weight 2.72 Kg. Left adrenal excised Dec. 1, 1932. Right adrenal excised Jan. 17, 1933. Intravenous injection of 1 cc. (= 3 Gm. cortex) Eschatin daily for a week beginning January 18, then 1.5 cc. for three days. On the eighth day the animal refused food, on the tenth day became apathetic and asthenic and was found dead on the morning of January 28.

CAT 3.—Female, weight 2.42 Kg. Left adrenal excised Dec. 1, 1932. Right adrenal excised Jan. 18, 1933. The animal was in excellent condition until the eighth day, when she ate only part of her meal. On the ninth day she ate about half of her usual meal and on the tenth day she refused food, was asthenic and apathetic. At 11:30 a. m. an intravenous injection of 10 cc. (= 300 Gm. cortex) Eschatin, undiluted, was administered. From ten to fifteen minutes after the injection the cat had a convulsion which was so violent as to cause her to turn a backward somersault. This was followed by coma for five or six hours. In the evening she was able to sit up but was quite wabbly and in a stupor. January 29, at 8:30 a. m., she was found in deep coma and died while preparations were being made for another injection.

CAT 4.—Male, weight 2.7 Kg. Right adrenal excised Dec 2, 1932. Left adrenal excised Jan. 17, 1933. Intravenous injection of 1 cc. (= 3 Gm. cortex) Eschatin daily for nine days beginning January 18 and 1.5 cc. for two days thereafter. The animal was in excellent condition for a week and then seemed somewhat less alert but still eating quite well for three days. January 28 he became apathetic and refused food; on this date his weight was 2.5 Kg. January 29, in the morning the cat was in deep coma; at 9:35 a. m. he had a convulsion and died at 9:40.

CAT 5.—Male, weight 3.21 Kg. Right adrenal excised Dec. 2, 1932. Left adrenal excised Jan. 17, 1933. Intravenous injection of 1 cc. (= 3 Gm. cortex) Eschatin daily for seven days beginning January 18 and 1.5 cc. for three days thereafter. The animal was in excellent condition for six days and on the seventh day showed some signs of asthenia and ate only part of a meal. From then on all food was refused and on January 28 the animal was quite apathetic; 5 cc. (= 150 Gm. cortex) Eschatin, undiluted, was administered intraperitoneally in the morning. At 6 p. m. there was no change in the animal and milk was refused. Weight 3.1 Kg. The animal was found dead the morning of January 29.

CAT 6.—Male, weight 2.32 Kg. Right adrenal excised Dec. 2, 1932. Left adrenal excised Jan. 18, 1933. Cat remained in excellent condition for five days. On January 24, he refused food but was not at all asthenic or apathetic. At 4 p. m. intravenous injection of 5 cc. (= 150 Gm. cortex) Eschatin, undiluted, was given. On January 25, the condition was unchanged, and he refused all food; intravenous injection of 5 cc. (= 150 Gm. cortex) Eschatin, undiluted. January 26, took a taste of salmon but refused any more food; subcutaneous injection of 5 cc. (= 150 Gm. cortex) Eschatin, undiluted. January 27, cat seemed limp, staggered on walking, refused all food; intravenous injection of 5 cc. (= 150 Gm. cortex) Eschatin, undiluted. January 28, 9 a. m., weight was 2.1 Kg.; comatose; dead at 9:30 a. m.

CAT 7.—Male, weight 2.72 Kg. Left adrenal excised Jan. 20, 1933. Right adrenal excised February 2. Cat was in good condition for six days. On February 9 and 10, the animal ate only part of his meals and showed some stiffness in hind legs and an unsteady gait. February 11, 8:30 a. m., asthenic and partly comatose but easily aroused; subcutaneous injection of 5 cc. (= 150 Gm. cortex) Eschatin, undiluted; 9:30 a. m., unchanged; 10 o'clock, deeper coma; 10:15, died.

CAT 8.—Male, weight 1.92 Kg. Left adrenal excised Jan. 20, 1933. Right adrenal excised February 2. Cat was in excellent condition until the fifth day, when the animal did not eat and showed some stiffness in hind legs on walking but was not apathetic; at 9:15 p. m., subcutaneous injection of 5 cc. (= 150 Gm. cortex) Eschatin, undiluted. February 8, took a taste of salmon but ate no more; seemed a bit less stiff in legs. February 9, in the morning, lethargic and quite wabbly; partly comatose; 10 a. m., subcutaneous injection of 5 cc. saline solution; at 11 o'clock, cat was decidedly more alert, appeared stronger and was able to stand and walk a few steps though wabbly, but this was not possible before the injection of saline. The animal remained perfectly conscious; at 3 p. m. showed signs of somnolence. At 9 o'clock, more lethargic but perfectly conscious. February 10, 12:30 a. m., comatose; prepared to give injection of Eschatin and when cat was picked up a spastic convulsion occurred followed by another one in which it died.

CAT 9.—Female, weight 1.1. Kg. Feb. 3, 1933, ligation of blood vessels of both adrenal glands. The animal was in good condition for about a week but at no time since the operation did she eat her full meal. On February 9, some stiffness developed in the hind legs. On February 11, refused all food, asthenic and somnolent but completely conscious; 5:30 p. m., subcutaneous injection of 4 cc. (= 120 Gm. cortex) Eschatin, undiluted. February 12, found dead in the morning.

CAT 10.—Male, weight 3.3 Kg. Feb. 3, 1933, ligation of blood vessels of both adrenal glands. The animal was in good condition until February 23, when food was refused for the first time but he was not asthenic or apathetic. February 24, animal became apathetic and wabbled when walking; 4:15 p. m. intraperitoneal injection of 6 cc. (= 180 Gm. cortex) Eschatin, undiluted; 8:45, more asthenic, intraperitoneal injection of 5 cc. (= 150 Gm. cortex) Eschatin, undiluted. February 25, in the morning, condition unchanged, refused all food; at noon given intraperitoneal injection of 5 cc. (= 150 Gm. cortex) Eschatin, undiluted; 6 p. m., condition unchanged, intraperitoneal injection of 5 cc. (= 150 Gm. cortex) Eschatin, undiluted; 6:30, more apathetic, weight 2.85 Kg. February 26, in the morning animal found dead.

CAT 11.—Male, weight 2.12 Kg. April 26, 1933, ligation of blood vessels of both adrenal glands. The animal remained in good condition with occasional symptoms of moderate adrenal insufficiency until May 31, when he refused food but later in the day lapped a few teaspoonfuls of milk. There was also a beginning unsteadiness in gait. June 1, decidedly wabbly and apathetic; 12:10 p. m., given intravenous injection of 6 cc. (= 180 Gm. cortex) Eschatin, undiluted; at 12:15, the cat emitted a yell, muscular twitchings and extensor rigidity developed in the legs, it was unable to raise its head and it seemed bordering on coma; 12:30, deep coma; 12:50, died.

It would have been desirable to include a larger number of cats in the tests with the Eschatin diluted to represent 3 Gm. of cortex per cubic centimeter. The expense of the material and other conditions, as already indicated, did not permit this to be done. Since there was not the slightest indication of prolongation of life in any of the animals, however, it is fair to assume that the extract was not as potent as any of the earliest products that Stewart and I prepared. Indeed, the evidence shows that Eschatin is totally ineffective when judged by the criterion of Pfiffner and Swingle[5] regarding its value in "the revival of cats prostrate from adrenal insufficiency." None of the cats tested derived any benefit from the extract, although one received the equivalent of 630 Gm. of cortex in two days, another 300 Gm. in one day, and a third 600 Gm. in four days. In two instances, cats 3 and 11, there was evidence of decided toxicity following the administration of Eschatin. It may be pointed out that Cleghorn[8] reported the presence of significant amounts of histamine, and Eagle[9] of choline, in similarly prepared adrenal cortical extracts. It is extremely surprising to have obtained such completely disappointing results, in view of the remarkable effects reported by Pfiffner and Swingle. At any rate, from the results of the tests made in these experiments the commercial extract does not seem to qualify as a "physiologically tested" product, and the evidence of toxicity renders it unsuitable for parenteral administration in human beings. In a normal individual and two patients with Addison's disease, serious reactions from administra-

8. Cleghorn, R. A.: Observations on Extracts of Beef Adrenal Cortex and Elasmobranch Interrenal Body, J. Physiol. **75**: 413 (Aug.) 1932.
9. Eagle, E.: Presence and Significance of Choline in Cortico-Adrenal Extract, Proc. Soc. Exper. Biol. & Med. **30**: 1094 (May) 1933.

tion of commercial extract of adrenal cortex were reported and attributed to the presence of protein (10 mg. per hundred cubic centimeters) and certain phenolic decomposition products of epinephrine in the extract.[10]

It is certain that in some of the experiments reported in the literature the amount of fluid administered greatly facilitated the beneficial influence of extracts. I have repeatedly observed spectacular recovery from coma and from less severe manifestations in adrenalectomized animals and in acute crises of Addison's disease, following the administration of relatively small volumes of physiologic liquids. It does not require much fluid to produce improvement in a cat that is in a severe state of adrenal insufficiency. Thus, in cat 8 the subcutaneous injection of 5 cc. of physiologic solution of sodium chloride at a time when symptoms of adrenal insufficiency were marked caused fully as great improvement as the previous day's injection of a similar amount of adrenal extract corresponding to 150 Gm. of cortex when the symptoms were not yet so severe. It must be remembered that spontaneous improvement may have occurred in either or both instances. In another animal (cat 12) severe symptoms developed in the beginning of the fourth day after excision of the second adrenal. The animal recovered from deep coma after intravenous injection of 20 cc. of physiologic solution of sodium chloride. The next morning a subcutaneous injection of 5 cc. of saline solution at 10 o'clock was followed by greater improvement, and at noon the cat ate some liver, although no food had been taken for two days previously. The animal remained in fairly good condition and was given another subcutaneous injection of 5 cc. of saline solution later in the day. The following day the animal declined, coma developed, and another subcutaneous injection of 5 cc. of saline solution was without effect, death occurring shortly after noon.

It is conceivable that, when adrenal extracts are made from the whole gland, epinephrine or perhaps other substances from the medulla may contribute either good or bad effects when administered. In a few experiments I have prepared extracts from the medulla of glands after dissecting it away from the cortex, using the same process in preparations from both portions of the gland. Such extracts had no demonstrable influence on the survival of adrenalectomized animals but seemed to be capable of reviving animals in acute crisis. They manifested greater toxic action than any extracts of cortex prepared by us and on subcutaneous injection caused severe local irritation, sometimes resulting in sloughing at the site of injection.

CONCLUSION

Not much has been added to knowledge of the adrenal cortical hormone since our demonstration of its availability in extracts of the gland. Obviously, it is not yet possible to rely with safety on the manufacture of such extracts on a commercial scale, for general use. Thus far the evidence offered to support claims of extraction of a purified crystalline hormone has not been convincing, although it may be hoped that this biochemical contribution will be accomplished before long.

1361 East One Hundred and Eleventh Street.

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Clinical Notes, Suggestions and New Instruments

VALUE OF MUSCULAR EXERCISE IN THE TREATMENT OF DIABETES MELLITUS

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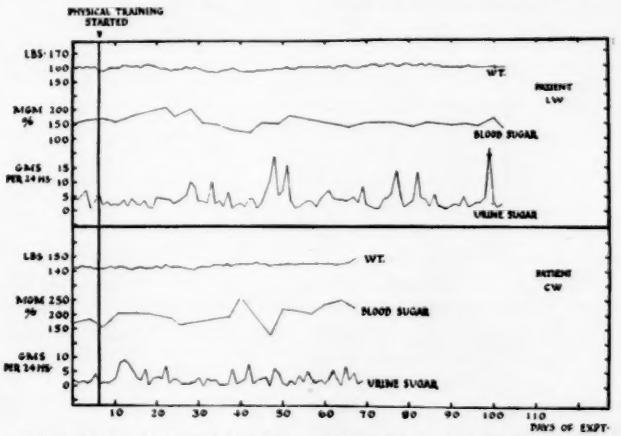
As early as 1868, Trousseau [1] reported the observation that muscular exercise decreased the glycosuria of diabetic patients. Similar observations have been reported by Zimmer [2] and by Mering and Finkler.[3] Külz and Rumpf,[4] on the other hand, found that while in some diabetic patients the glycosuria decreased after physical exertion, in others it increased. The observations of von Noorden [5] (by whom the aforementioned references are quoted) agreed with those of Külz. Von Noorden concluded that while in mild diabetes muscular work may decrease the glycosuria, in severe diabetes it has the reverse effect.

With the advent of practical methods for the determination of the blood sugar, Allen [6] reported that exercise caused a fall in the blood sugar level of diabetic patients. Since the discovery of insulin, Lawrence,[7] Burger and Kramer,[8] Gerl and Hoffman,[9] and Sendrail and Blancardi [10] have observed that muscular exercise increases the hypoglycemic action of insulin, both in diabetic patients and in normal dogs.



Daily weight and twenty-four hour sugar excretion for the control period and the entire period of physical training. The fasting blood sugar levels are recorded twice a week.

This literature forms the apparent background for the emphasis that modern textbooks [11] place on the value of exercise and physical training in the treatment of diabetes mellitus. It will be observed that these references deal with temporary fluctuations in glycosuria and hyperglycemia brought

Aided by the Max Pam Fund for Metabolic Research.
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From the Max Pam Unit for Metabolic Research and the Department of Physical Therapy, Michael Reese Hospital.

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2. Zimmer: Die Muskeln eine Quelle: Die Muskelarbeit ein Heilmittel des Diabetes, Carlsbad, 1880.
3. Mering and Finkler: Diskussion über Diabetes Mellitus, Kong. f. inn. Med. **171**: 190, 1886.
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5. von Noorden, Carl: Die Zuckerkrankheit, Berlin, August Hirschwald, 1912; Handbuch d. Path. d. Stoffw., Berlin, August Hirschwald, **2**: 65, 1907.
6. Allen, F. M.; Stillman, Edgar, and Fitz, Reginald: Total Dietary Regulation in the Treatment of Diabetes, monograph 11, New York Rockefeller Institute for Medical Research, 1919.
7. Lawrence, R. D.: The Action of Insulin in Glycogen Formation and Its Therapeutic Application, Quart. J. Med. **20**: 69 (Oct.) 1926.
8. Burger, M., and Kramer, H.: Ueber die durch Muskelarbeit hervorgerufene Steigerung der Insulin Wirkung auf den Blutzuckergehalt beim normalen und gestorten Kohlehydratsstoffwechsel und ihre praktische und theoretische Bedeutung, Klin. Wchnschr. **7**: 745 (April 15) 1928.
9. Gerl, A., and Hoffman, A.: Muskelarbeit und Insulin Bedarf beim Diabetes, Klin. Wchnschr. **7**: 59 (Jan. 8) 1928.
10. Sendrail, M., and Blancardi, C.: Action du travail musculaire sur la sensibilité à l'insuline, Compt. rend. Soc. de biol. **110**: 1190 (Aug. 12) 1932.
11. Joslin, E. P.: Treatment of Diabetes Mellitus, Philadelphia, Lea and Febiger, 1928.

about by muscular work. We are familiar with only one report that deals with the effects of daily exercise on the diabetic state of an individual observed for weeks. Lawrence [12] reported that an increase in the exercise of such a patient on a constant diet allows the reduction of insulin dosage without increase in diabetic manifestations. Our previous work [13] has indicated the difficulty of drawing valid conclusions from therapeutic experiments on diabetic patients, unless those patients are under constant and adequate control approaching that of the laboratory. Because of this and because of our distrust of temporary fluctuations in the glycosuria and hyperglycemia as criteria of diabetic tolerance, we undertook the following therapeutic experiment:

METHOD

Two young men, suffering from uncomplicated diabetes mellitus, were admitted to the Max Pam Metabolism Unit of the Michael Reese Hospital, where they remained for the entire period of the experiment. Both patients had been unemployed for over a year at the time of admission, and both were in a comparatively poor state of physical training. During a control period of several weeks, in which the patients underwent no more physical exertion than the average ambulatory hospital patient, their diabetic tolerance was established. At the same time their muscular ability and physical condition were measured by suitable tests. Once the control period was over, physical training was begun. Starting with simple setting up exercises, the daily muscular work was gradually increased so as to include walking, rowing, boxing, handball and basketball. The effects of this training on the physical condition and the diabetic tolerance were observed.

RESULTS

Most of the significant data are summarized in table 1. To conserve space, some of the many stages in the experiments have been omitted. The periods detailed in the table therefore present a foreshortened view of the experiments. The figures in each representative period are averages for the number of days specified. The chart graphically presents the daily variations in weight, glycosuria and fasting blood sugar throughout the whole experiment. It should be noted that the blood sugar determinations are fasting values and represent the highest levels attained during the twenty-four hours in these insulin treated cases.

CASE 1.—L. W., a man, aged 32, had had diabetes for three years. The physical examination and history were negative except for the diabetes. The basal metabolic rate was 4.4 plus.

The preliminary periods in this case illustrate the progressive improvement in diabetic tolerance, so often observed during the initial stages of hospitalization.[14] The period designated "control" is that at which we judged that this initial improvement had reached its limit. It may be seen that the subsequent periods of increasing exercise, encompassing three months of physical training, show no significant decrease in the daily glycosuria or the fasting blood sugar. Repeated tests of the blood sugar level just before and immediately after a period of vigorous exercise in this patient revealed no effect whatever. Thus, during one test it was 147 mg. per hundred cubic centimeters before and 148 after; in another it was 166 before and 165 after.

CASE 2.—C. W., a youth, aged 20, had had diabetes for four years. The physical examination and history were negative except for the diabetes. The basal metabolic rate was 8.3 plus.

TABLE 1.—*Representative Periods at About Equal Time Intervals Throughout the Experiments* *

				Test of Physical Condition			Diet					Fasting Blood Sugar, Mg. per 100 Cc.	Urine	
	Period	Days of Experiment	Exercise†	Master's Vital Test, Min.‡	Capacity, Liters	Weight, Pounds	Phosphorus, Gm.	Fat, Gm.	Carbohydrate, Gm.	Calories	Insulin Units 24 Hrs.		Nitrogen, Gm. per 24 Hrs.	Sugar, Gm. per 24 Hrs.
L. W.	Preliminary	1-9	None	7	3.4	161	80	180	100	2,340	15-15-10	191	8.00	7.50
	Preliminary	32-34	None	5	4.0	162.4	80	180	120	2,420	15-10-10	125	12.37	1.61
	Preliminary	45-50	None	6	4.0	161.4	80	180	140	2,500	15- 0-10	131	10.66	1.21
	Control	51-57	None	6	4.0	160.9	80	180	140	2,500	10- 0-10	157	12.01	4.75
	Exercise	79-86	S 30 B 15	4	4.5	158.4	80	180	140	2,500	10- 0-10	171	9.75	5.89
	Exercise	113-120	S 30, B 15 R 15	3.5	4.7	158.8	80	180	140	2,500	10- 0-10	149	10.60	4.31
	Exercise	141-148	S 45, R 30 B 15, X 30	3.5	4.7	158	80	180	140	2,500	10- 0-10	149	10.93	2.62
C. W.	Preliminary	1-5	None	5.5	4.2	143.2	75	140	125	2,056	25-25-25	289	11.35	28.22
	Preliminary	5-13	None	3.5	4.2	143.4	75	120	120	1,860	30-30-30	275	11.89	13.37
	Control	13-37	None	3.5	4.0	142.3	75	120	120	1,860	30-25-35	195	9.63	3.14
	Exercise	51-58	S 60	3.5	3.8	142.4	75	120	120	1,860	30-25-35	201	6.82	2.29
	Exercise	72-79	S 60, W 15 R 20, X 15	1.5	4.5	144.7	75	120	120	1,860	30-25-35	265	7.67	4.77
	Exercise	86-93	S 60, W 20 R 30, X 30	1.5	4.7	145.3	75	120	120	1,860	30-25-35	230	8.65	2.51

* The figures represent average values for the number of days indicated. The authors are indebted to the Department of Chemistry for aid with the chemical determinations.

† In this column the letters indicate the type of exercise: S = Swedish drill, B = basketball, R = rowing, W = walking, X = boxing. The figures following these letters refer to the number of minutes' duration of these exercises per day.

‡ The number of minutes recorded in this column indicate the time required for the pulse rate and blood pressure to return to the resting value following the prescribed standard amount of exercise.

Here again there was no significant change from the diabetic status of the control period during the course of physical training. The observations as to the immediate effect of exercise on the blood sugar level in this patient are given in table 2.

SUMMARY AND CONCLUSIONS

Two carefully controlled cases of uncomplicated diabetes mellitus have been observed over an extended period before, during and after a systematic course of physical training.

TABLE 2.—*Effect of Exercise on Blood Sugar Level in Case 2*

	Blood Sugar, Mg. per 100 Cc.
1. Morning test, no food or insulin since previous evening	
½ hour before exercise	228
Immediately before exercise	233
(½ hour of setting up exercises, boxing and rowing)	
Immediately after exercise	261
½ hour after exercise	290
2. Three hours after lunch and noon dose of insulin	
½ hour before exercise	51
Immediately before exercise	61
(½ hour of exercise as above)	
Immediately after exercise	61
½ hour after exercise	74

Although the muscular work and the physical conditioning produced their usual salutary effects on the general well being and the muscular power of the subjects, no evidence of a significant improvement in the diabetic tolerance or a decrease in the insulin requirements was obtained.

Twenty-Ninth Street and Ellis Avenue.

12. Lawrence, R. D.: The Effect of Exercise on Insulin Action in Diabetes, Brit. M. J. **1**: 648 (April 10) 1926.

13. Soskin, Samuel; Binswanger, H. F., and Strouse, Solomon: Jerusalem Artichokes and Liver in the Treatment of Diabetes Mellitus, Am. J. M. Sc. **182**: 675 (Nov.) 1931.

14. Strouse, Solomon, and Soskin, Samuel: Clinical Experimental Studies on the Treatment of Diabetes Mellitus, Libman Anniv. Vol. **3**: 1135, 1932.

Special Article

ALTHOUGH A NUMBER OF BACTERIOPHAGE AND ANTIVIRUS PRODUCTS HAVE APPEARED ON THE MARKET DURING THE PAST SIX YEARS, RELATIVELY FEW HAVE BEEN SUBMITTED TO THE COUNCIL ON PHARMACY AND CHEMISTRY. NONE HAVE BEEN ACCEPTED FOR INCLUSION IN NEW AND NONOFFICIAL REMEDIES. INQUIRIES FROM PHYSICIANS, HOWEVER, AND THE ADVERTISEMENTS OF MANUFACTURERS INDICATE THAT THE EXPLOITATION OF THESE PREPARATIONS IS SUFFICIENT TO WARRANT THE PUBLICATION OF A REPORT ON THEM. AS THE SUBJECT IS RELATIVELY NEW AND OBSCURE, AND AS THE PUBLISHED ACCOUNTS OF BACTERIOPHAGE THERAPY ARE CONFLICTING, IT IS OBVIOUS THAT A REPORT LIMITED TO COMMENTS ON THE COMMERCIAL PREPARATIONS WOULD HAVE ONLY A RESTRICTED USEFULNESS. BELIEVING THAT PHYSICIANS DESIRE A MORE EXTENSIVE PRESENTATION OF INFORMATION ABOUT BACTERIOPHAGE AND THE PRINCIPLES AND POSSIBILITIES OF BACTERIOPHAGE THERAPY, THE COUNCIL ON PHARMACY AND CHEMISTRY HAS AUTHORIZED THE PUBLICATION OF THIS REVIEW. IN ADOPTING THIS REPORT THE COUNCIL EXPRESSED APPRECIATION OF THE EXCELLENT WORK OF DRS. EATON AND BAYNE-JONES.

PAUL NICHOLAS LEECH, Secretary.

BACTERIOPHAGE THERAPY

REVIEW OF THE PRINCIPLES AND RESULTS OF THE USE OF BACTERIOPHAGE IN THE TREATMENT OF INFECTIONS

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AND
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The purpose of this report is (*a*) to present summaries and discussions of (1) the experimentally determined facts relating to the bacteriophage phenomenon, (2) the laboratory and clinical evidence for and against the therapeutic usefulness of bacteriophage and (3) the relation of so-called antivirus to materials containing bacteriophage, and (*b*) to serve as a basis for a survey of the status of some of the commercial preparations. As it is impossible to include in this article an abstract of the whole voluminous and contradictory literature on these subjects, we have summarized only the papers and reviews that have appeared to us to be the most significant.

MODE OF ACTION AND NATURE OF BACTERIOPHAGE

Transmissible lysis of bacteria was discovered independently by Twort[1] in 1915 and by d'Herelle[2] in 1917. As d'Herelle has stated that he noticed the effect of the lytic agent first in 1909 and as the phenomena described by these two observers differ in some characteristics, there has been a sharp controversy over claims for priority. In recognition of this some authors refer to the process as the "Twort-d'Herelle phenomenon." d'Herelle's observations, however, have had such a widespread influence on the experimental and clinical studies of others that most authors call the phenomenon "bacteriophagy," adopting the name "bacteriophage," which d'Herelle gave to the lytic agent in order to express his belief that it is a living "devourer of bacteria."

The readily demonstrable effects on bacteria in cultures and some of the chief characteristics of the lytic principle are described briefly in the following modified form of the summary published by Topley and Wilson[3] in 1931:

1. Bacteriophage causes partial or complete lysis of bacteria in cultures during the early phases of bacterial growth. In cultures on agar, circular, clear, glassy areas of lysis are produced in the colonies or the edges of the colonies are "moth-eaten" or indented. In broth cultures a partial or complete clearing of the originally turbid fluid occurs as a consequence of the dissolution of the bacterial cells.

2. As a result of the action of bacteriophage on a bacterial culture, variants of the bacterium arise. These variant strains may have increased or decreased virulence as compared with the culture from which they were derived. Many of the variants are completely resistant to the bacteriophage which lysed the sensitive parent culture.

3. Bacteriophage is filtrable through Berkefeld, Chamberland and other bacteria-retaining filters. The lytic principle can be separated by filtration from the intact bacterial cells.

4. Bacteriophage is active (in vitro) in high dilutions. Often one part of lytic filtrate to one billion parts of culture will bring about lysis.

5. Bacteriophage can be propagated in series indefinitely by transference of a small amount of fluid or filtrate from one lysed culture to another young, growing culture of susceptible bacteria.

6. Bacteriophage cannot be propagated on bacteria-free mediums, and the lytic principle does not increase in association with old or dead bacteria, or bacterial products.

7. Young and actively growing cultures are lysed by bacteriophage. Old cultures, cultures not actively growing and cultures in which growth has been inhibited by antiseptics or other means are not dissolved.

8. Bacteriophages are usually specific for species or races of bacteria and have little or no effect on unrelated or dissimilar bacteria. Some lytic principles are strictly specific, others may affect related bacterial species or strains.

9. Changes in the ability of a specimen of bacteriophage to lyse or affect single species or groups of bacteria may be produced by serial propagation in association with susceptible bacteria. The activity of the lytic principle against a specific bacterium may often be increased, and its activity toward other strains may at the same time increase, remain unaffected or decrease.

10. The bacteriophage appears to be a particulate body. So-called races of bacteriophage have been estimated to have diameters of the order of from 10 to 50 millimicrons.

11. Serologic studies indicate that bacteriophages have distinct antigenic properties.

12. The resistance of bacteriophage to heat and chemicals is less than that of bacterial spores but slightly greater than that of vegetative cells. It withstands aging for long periods.

Space does not permit a thorough discussion of the highly controversial question of the nature of bacteriophage. The various views on this subject may be grouped as follows:

THEORIES

1. d'Herelle[4] has always contended that the bacteriophage is a living submicroscopic virus, parasitic on susceptible bacteria. The principal point of evidence in favor of this view is the fact that the lytic agent may be propagated indefinitely in cultures of susceptible bacteria. d'Herelle regards this as evidence of multiplication. Phenomena of apparent adaptation, antigenic specificity and analogies to filtrable viruses are cited by d'Herelle as additional support for his opinion. These and other arguments advanced by d'Herelle are

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Prepared for the Council on Pharmacy and Chemistry of the American Medical Association.

1. Twort, F. W.: An Investigation on the Nature of Ultra-Microscopic Viruses, Lancet **2**: 1241-1243, 1915; Les agents bactériolytiques filtrables et transmissibles (bactériophage), Ann. Inst. Pasteur **47**: 459-469 (Nov.) 1931; Filter-Passing Transmissible Bacteriolytic Agents (Bacteriophage), Lancet **2**: 1064-1067 (Nov. 15) 1930.

2. d'Herelle, Felix: Microbiologie—sur un microbe invisible antagoniste des bacilles dysentériques, Compt. rend. Acad. d. sc. **165**: 373-380, 1917.

3. Topley, W. W. C., and Wilson, G. S.: The Twort-d'Herelle Phenomenon, chapt. X in The Principles of Bacteriology and Immunity, New York, William Wood & Co. **1**: 224-233, 1931.

4. d'Herelle, Felix: The Bacteriophage and Its Behavior, Baltimore, Williams and Wilkins Company, trans. by G. H. Smith, 1926.

plausible and are not refuted by the facts. They have not, however, been accepted generally and are not more convincing than other lines of evidence in favor of other views. It is obvious that the theory of d'Herelle is of great scientific influence and importance. Unfortunately it has been exploited detrimentally by manufacturers of commercial bacteriophage preparations, as has been pointed out in several editorials in THE JOURNAL on the "bacteriophage metaphor." [5]

2. Many investigators have regarded the bacteriophage as an inanimate substance, perhaps an enzyme or activator of an endocellular hydrolytic bacterial enzyme, having its origin in the bacterial cell which it lyses and, being capable of lysing other cells, increasing in amount in the process. The absence of convincing evidence of the living nature of bacteriophage and the results of studies on the mode of action of the lytic principle, and the effects of substances on it, have favored this theory. A review of this evidence has been presented by Bronfenbrenner.[6] More recent evidence in support of it has been provided by Krueger and Tamada,[7] Krueger and Northrop,[8] Hetler and Bronfenbrenner [9] and Krueger and Baldwin.[10]

3. Bordet and his associates,[11] Arkwright [12] and other investigators have held the opinion that bacteriophage is an inanimate substance which affects physiologic or hereditary processes of the sensitive bacteria in such a way that early death and autolysis of the culture is brought about. This tendency to rapid autolysis may be transmitted from generation to generation by heredity, and autolysis of the cells liberates the substance that may in turn affect other sensitive bacteria.

4. Hadley,[13] like d'Herelle, has emphasized the ability of the bacteriophage to induce rapid and extensive variation in bacterial cultures, aside from its lytic activity. This fact, coupled with other lines of evidence, has led Hadley to postulate that the bacteriophage is a filtrable stage in a complex life cycle of a bacterium. According to this view, the bacteriophage stimulates the microscopically visible bacteria of the culture to pass into a submicroscopic filtrable stage. This theory resembles the older "splitter" theory of Bail and has some elements in common with discussions of the possible independent viability of genes. The occasional late growth of bacteria in lytic filtrates and observations made with serial transfers have been the basis of the claims made by Hadley [14] and by Kendall and Walker [15] that this process can be reversed and that living, microscopically visible, bacteria of the original species can be recovered from filtrates of lysed cultures. Adequate confirmation of this work is lacking at present.

ORIGIN OF BACTERIOPHAGE

Closely bound up with the nature of the bacteriophage is the problem of its origin. d'Herelle believes that the principle has a single original source, possibly in the intestines of man and animals (because of the abundance of bacteriophage in sewage) and that all specific lines of the bacteriophage have been derived from this by a process of adaptation to particular bacterial species. On the other hand, Hadley believes that the production of bacteriophage from such sources as sewage and pancreatic extracts is due to the effect of some substance on the bacterial culture which causes the appearance of bacteriophage from the culture itself. Good evidence of the spontaneous origin of bacteriophage in previously unaffected cultures is lacking. Lytic filtrates of sewage are usually mixtures of bacteriophage, which require purification for specific studies.[16]

It was pointed out in the beginning of this report that many lines of bacteriophage are highly specific. Thus a bacteriophage may act strongly on one strain of Bacillus coli and weakly or not at all on another. A certain degree of adaptation of the lytic principle can take place by serial passage through many cultures of the same strain of bacteria. The importance of these facts in the therapeutic application of the bacteriophage will be pointed out later. Similarly, the inverse adaptation of bacteria to bacteriophage, the production of resistant forms and variants, must be considered.

The bacteriophage filtrate, when injected into an animal, possesses the ability to produce an antibacteriophage. The serum of the immunized animal will sometimes inactivate the homologous bacteriophage or inhibit its activity. Repeated injection of bacteriophage is followed by increasing rapid disappearance of the lytic agent from the blood.[17] The nature and extent of this effect is not at present fully understood.

COMPOSITION OF LYTIC FILTRATES

In any discussion of the therapeutic effects of the bacteriophage, the composition of the filtrates of lysed cultures must be borne in mind. Practically all bacteriophage preparations are made by filtering broth cultures of bacteria which have been lysed by the bacteriophage. These filtrates, although generally called "bacteriophage," contain in addition to the lytic principle a number of other substances, which may be divided into two classes:

1. Those substances originally present in the sterile broth used to grow the bacteria. These include meat extractives and muscle proteins; amino-acids, peptones and proteoses; nitrogenous organic bases, and a number of other substances, many of which are of unknown composition.

2. Those substances derived from the bacteria themselves. These include antigenic substances derived from the bacteria such as the bacterial proteins, prod-

5. Bacterial Auto-Aggressins, editorial, J. A. M. A. **94**: 269 (Jan. 25) 1930; correspondence, ibid. **94**: 503 (Feb. 15) 1930.

6. Bronfenbrenner, Jacques: The Bacteriophage: Present Status of the Question of Its Nature and Mode of Action, in Jordan, E. O., and Falk, I. S.: New Knowledge of Bacteriology and Immunology, University of Chicago Press, 1928, chapt. 40, pp. 525-556. Bronfenbrenner, Jacques: Filterable Viruses, Baltimore, Williams and Wilkins, 1928, pp. 373-403; edited by T. M. Rivers.

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11. Bordet, J., and Ciuca, M.: Exudats leucocytaires et autolyse microbienne transmissible; le bactériophage de d'Herelle, sa production et son interprétation, Compt. rend. Soc. de biol. **83**: 1293-1298, 1920. Bordet, J.: Problem of Bacteriophage or of Transmissible Bacterial Autolysis, Ann. Inst. Pasteur **39**: 717-763, 1925.

12. Arkwright, J. A.: Source and Characteristics of Certain Cultures Sensitive to Bacteriophage, Brit. J. Exper. Path. **5**: 23-33 (Feb.) 1924

13. Hadley, P.: Twort-d'Hérelle phenomenon; critical review and presentation of new conception (homogamic theory) of bacteriophage action, J. Infect. Dis. **42**: 263-434 (April) 1928.

14. Hadley, P.; Delves, E., and Klimek, J.: Filtrable Forms of Bacteria; Filtrable Stage in Life History of Shiga Dysentery Bacillus, J. Infect. Dis. **48**: 1-159 (Jan.) 1931.

15. Kendall, A. I., and Walker, A. W.: Occurrence of Bacteria in the Filtrable State in Active Bacteriophage, J. Infect. Dis. **53**: 355-371 (Nov.-Dec.) 1933.

16. Asheshov, I. N.; Asheshov, I.; Khan, S., and Lahiri, M. N.: Studies on Cholera Bacteriophage, Indian J. M. Research **20**: 1101-1188 (April) 1933.

17. Kendrick, P.: The Antigenic Properties of Bacteriophage Lysates of Salmonella Suipestifer; Rate of Disappearance of Injected Bacteriophage from the Blood Stream of Rabbits, Am. J. Hyg. **17**: 318-328 (March) 1933.

ucts of the metabolism of the bacteria, and other substances resulting from the lysis of the bacteria. In this class may also be included the so-called antivirus of Besredka.[18] Besredka reports that the antivirus is present in filtrates of broth cultures of various organisms. Lysis by the bacteriophage is not necessary to liberate it.

It is difficult or impossible to separate the bacteriophage from many of these substances; consequently the reported effect of lytic filtrates when injected into an animal or man may be due, in part at least, to substances other than the bacteriophage. Among the most important of these effects to be considered are:

1. Protein shock as a result of the proteoses, peptones and bacterial proteins.
2. Immunization by the antigenic bacterial proteins. This would require a period of at least four or five days before an effect would be noticeable.
3. The antivirus effect reported by Besredka.

REVIEW OF BACTERIOPHAGE THERAPY

Since the majority of the claims for the therapeutic use of bacteriophage have been based on its ability to lyse bacteria, and apparently destroy them, it seems advisable, before the literature on the clinical use of the bacteriophage is reviewed, to cite a number of experiments which may help to answer the question Does bacteriophage lyse susceptible bacteria in vivo as it does in vitro?

1. *In Vitro Experiments Relating to Bacteriophage Therapy.*—d'Herelle claimed that the lytic process produced by the bacteriophage is not modified by normal serum, ascitic fluid, or urine, although he admits that bile is inhibitory. These conclusions have been tested by a large number of experiments both in vitro and in vivo and have been contradicted in many cases. Thus whole blood from human beings or animals has been shown to be markedly or completely inhibitory to the lysis of streptococcus, staphylococcus, typhoid bacillus, and colon bacillus by the homologous bacteriophage (Friedberger and Vallen,[19] Clark and Clark,[20] Appelbaum and MacNeal,[21] Evans[22]). The inhibitory action of blood appears to be due mainly to the serum portion as reported by Evans[22] and by Appelbaum and MacNeal.[21a] A large number of other investigators have also noted the inhibitory action of human or animal serum on bacteriophage for staphylococcus, streptococcus, colon bacillus, anthrax bacillus, dysentery bacillus and subtilis bacillus, the inhibition being almost complete with undiluted serum (Gratia and Jaumain,[23] Zdansky,[24] Riding,[25] Cowles and Hale,[26] Gratia and Mutsaars,[27] Colvin[28]). When the serum is diluted the degree of inhibition becomes less and varies with the source of the serum and species or strain of bacterium and bacteriophage under investigation. Since the experiments cited have been adequately confirmed and are at present practically undisputed, there is convincing evidence that the action of bacteriophage is markedly inhibited by whole blood and undiluted serum.

Results of studies on the effect of other body fluids on the bacteriophage have been more variable. Colvin[28] and Evans[22] have noted the inhibitory effect of pus on bacteriophage for streptococcus and anthrax bacillus. Bruynoghe and Maisin[29] noted the disappearance of bacteriophage activity in the pus of staphylococcic abscesses. Appelbaum and MacNeal[21a] found that purulent exudate was inhibitory in concentrations as high as 1:1,000 for staphylococcus bacteriophage. However, the same authors found that pus in similar experiments had very little inhibitory action on colon bacillus bacteriophage.

The inhibitory action of urine seems to be less striking in most cases than is that of other body fluids (Colvin[28] and Evans[22]). Colvin found that the lysis of staphylococcus by the homologous bacteriophage in the presence of urine was complete in the case of one strain, partial with another strain and negative with a third strain. Larkum[30] made similar observations.

TABLE 1.—*Inhibitory Action of Body Fluids*

Marked or Complete Inhibition with All Bacteriophages So Far Investigated	Degree of Inhibition Varies with Different Bacteriophages and Different Animal Species
Whole blood	Pus
Undiluted serum	Urine
Bile	Ascitic fluid
Saliva (streptococcus only)	Cerebrospinal fluid
Autoclaved intestinal mucus (dysentery only)	

The inhibitory action of bile seems to be undisputed.

Several of the authors already cited have investigated the action of other body fluids on bacteriophage, including ascitic fluid, saliva, cerebrospinal fluid and autoclaved intestinal mucus. The results of the work on the inhibitory action of these and the other body fluids already mentioned are summarized in table 1.

Further confirmatory evidence of the inhibitory action of body fluids is offered by the experiments of Dresel and Lewis,[31] with tissue cultures infected with mouse typhoid bacilli and subjected to the homologous bacteriophage. With mouse tissue and chicken tissue in plasma and Ringer's solution the bacteriophage failed to lyse the susceptible organisms but remained in the cultures for as long as eleven days. When the cultures were spread on agar, lysis of the organism proceeded. The bacteriophage did not appear to affect the growth of the tissue cells, nor did the cells destroy the bacteriophage. The lytic agent remained in a state of suspended activity in the tissue cultures.

2. *Bacteriophage Therapy in Experimental Animals.*—Bronfenbrenner[6] has pointed out that one of the chief points of evidence against the therapeutic value of

18. Besredka, Alexander: Local Immunization: Specific Dressings, Baltimore, Williams and Wilkins, edited and translated by Harry Plotz, 1927.
19. Friedberger, E., and Vallen, J.: Action of Typhoid Bacteriophage in Presence of Erythrocytes, Klin. Wchnschr. **2**: 1649-1650 (Aug. 27) 1923.
20. Clark, P. F., and Clark, A. S.: Bacteriophage Active Against Virulent Hemolytic Streptococcus, Proc. Soc. Exper. Biol. & Med. **24**: 635-639 (April) 1927.
21. Applebaum, Martha, and MacNeal, W. J.: (*a*) Influence of Pus and Blood on Action of Bacteriophage, J. Infect. Dis. **49**: 225-243 (Sept.) 1931; (*b*) Influence of Blood and Exudates on the Action of Bacteriophage Against Colon Bacillus, J. Infect. Dis. **50**: 269-276 (March) 1932.
22. Evans, Alice C.: Inactivation of Antistreptococcus Bacteriophage by Animal Fluids, Pub. Health Rep. **48**: 411-426 (April 21) 1933.
23. Gratia, A., and Jaumain, D.: Dualité du principe lytique du colibacille et du staphylocoque, Compt. rend. Soc. de biol. **85**: 882-884, 1921.
24. Zdansky, E.: Kritische und experimentelle Beiträge zur Frage der Wirkungsmöglichkeit der Bakteriophagen im Warmblüterorganismus und in der freien Natur, Ztschr. f. Hyg. u. Infektionskr. **103**: 164-176, 1924.
25. Riding, D.: Acute Bacillary Dysentery in Khartoum Province, Sudan, with Special Reference to Bacteriophage Treatment: Bacteriological Investigation, J. Hyg. **30**: 387-401 (Aug.) 1930.
26. Cowles, P. B., and Hale, W. M.: Effect of Bacteriophage on Experimental Anthrax in White Mice, J. Infect. Dis. **49**: 264-269 (Sept.) 1931.
27. Gratia, A., and Mutsaars, W.: L'action inhibitrice du sérum normal sur la lyse du staphylocoque doré par les bactériophages staphylococciques polyvalents, Compt. rend. Soc. de biol. **106**: 943-945 (April 16) 1931.
28. Colvin, M. G.: Behavior of Bacteriophage in Body Fluids and in Exudates, J. Infect. Dis. **51**: 527-541 (Nov.-Dec.) 1932.
29. Bruynoghe, R., and Maisin, J.: La Phagocytose du Bactériophage, Compt. rend. Soc. de biol. **86**: 292-293, 1922.
30. Larkum, N. W.: Bacteriophagy in Urinary Infection; Bacteriophagy in Bladder, J. Bact. **12**: 225-242 (Sept.) 1926.
31. Dresel, L., and Lewis, M. R.: Study of Bacteriophage in Tissue Cultures, Am. J. Hyg. **11**: 189-195 (Jan.) 1930.

the bacteriophage is the almost uniform failure of a large number of investigators to demonstrate a curative effect of the lytic principle in carefully controlled laboratory experiments on infected animals. In a more recent review, Hoder [32] cites a similar series of experiments, most of which were negative.

Attempts to treat staphylococcus and streptococcus septicemias in rabbits and mice have without exception failed, even when the bacteriophage is injected simultaneously with the bacterial culture. (Clark and Clark,[20] Eliava,[33] Krueger, Lich and Schulze,[34] Evans [22]). Failure to affect the course of Shiga dysentery and Bacillus coli infections by simultaneous injections of bacteriophage in rabbits was also reported by Eliava. Harris and Larimore [35] reported no protective or curative effect of bacteriophage in typhoid infections in guinea-pigs and mice. On the other hand, a few positive results have been reported when active bacteriophage was injected simultaneously with organisms of the colon-typhoid-dysentery group into rabbits and mice, but injection of the bacteriophage from thirty minutes to three days later failed to influence the course of the infection (Arnold and Weiss [36] and Walker [37]).

Many attempts to treat experimental plague in various laboratory animals have been unsuccessful. In rabbits, guinea-pigs, white rats, and mice the injection of bacteriophage failed to influence the course of the disease (Compton,[38] Flu [39] and Naidu and Avari [40]). Flu also performed a series of experiments on chickens, which are not susceptible to plague but carry the bacillus many days in the blood. He was unable to demonstrate that the injection of bacteriophage caused any decrease in the number of bacilli in the circulating blood. In a similar experiment, using rabbits with Shiga bacillus bacteremia, Kabéshima [41] was unable to demonstrate a sterilization of the blood in seven days by the repeated intravenous injection of Shiga bacteriophage, but the length of time required raises the question as to whether active immunity was produced and not actual lysis of the organism.

The treatment of experimental infections of a more or less localized character has been studied to a limited extent. B. coli cystitis in rabbits and guinea-pigs is reported by Larkum [30] and Marcuse [42] to be cured or markedly alleviated by the action of the bacteriophage. In a study of the effect of bacteriophage on staphylococcic and streptococcic skin lesions in rabbits, Walker [43] found that, although admixture of the lytic principle and the organisms immediately before injection caused a reduction in the size of the lesions, no effect on the lesions was produced by local or intravenous injection either immediately after injecting the organisms or after the lesions had developed. Kolmer and Rule [44] succeeded in reducing the mortality of experimental streptococcic meningitis in rabbits from 100 per cent to about 60 per cent by injection of bacteriophage into the carotid artery.

The early experiments of d'Herelle on fowl typhoid, in which the mortality was reduced from 95 per cent or over to 5 per cent by treatment with bacteriophage, held out great promise for the use of this agent in therapeutics. On the basis of these experiments d'Herelle has contended that bacteriophage therapy is applicable only to natural infectious diseases and that experiments on artificially infected animals were not valid. In hemorrhagic septicemia of water buffaloes, on the contrary, d'Herelle could demonstrate no therapeutic effect of the bacteriophage although an immunity was produced twenty days after the injection of the lytic filtrate. Colvin,[45] using a bacteriophage of maximum activity in vitro, had little or no success in the treatment of infectious streptococcic lymphadenitis of guinea-pigs. There was some evidence that bacteriophage therapy was not entirely harmless. In an extensive series of experiments on the effect of bacteriophage on epidemic mouse typhoid caused by Bacillus aertrycke, Topley, Wilson and Lewis [46] concluded that there was no reduction of the mortality or the excretion of the organisms even though the bacteriophage was fed to the infected mice over a period of three months. Colvin [45] has pointed out that at least five other investigators have failed in attempts to treat mouse typhoid with bacteriophage. Pyle [47] reported similar failures in the treatment of pullorum disease of chickens with a bacteriophage that was highly active for the infecting organism in vitro.

From a consideration of the laboratory experiments just described, it is evident that the bacteriophage does not produce any such dramatic effect on susceptible bacteria in the animal body as it does in the test tube. In many of the experiments cited, the conditions appeared to be ideal for the lysis of the organisms by the bacteriophage, but in practically all cases no effect was produced, probably because of the inhibitory action of the body fluids and tissues on the lytic principle. Judging from the experiments cited, the greatest chance for success in the therapeutic use of the bacteriophage would be in localized infections of certain of the body cavities where these inhibitory conditions are at a minimum, as in the bladder, in the subarachnoid space, perhaps in the intestine, and possibly in abscess cavities and wounds. Of the various species of bacteria studied in experimental infection, some members of the colon-typhoid-dysentery group seem to be slightly more susceptible to the action of the bacteriophage in vivo than do the pyogenic cocci and other bacteria. But even with the most susceptible organisms under the least

32. Hoder, F.: Die Bakteriophagen in der Therapie, Med. Klin. **29:** 93-96 (Jan. 13) 1933.
33. Eliava, G.: Au sujet de l'adsorption du bactériophage par les leucocytes, Compt. rend. Soc. de biol. **105:** 829-831 (Jan. 8) 1930.
34. Krueger, A. P.; Lich, R. Jr., and Schulze, K. R.: Bacteriophage in Experimental Staphylococcal Septicemia, Proc. Soc. Exper. Biol. & Med. **30:** 73-75 (Oct.) 1932.
35. Harris, W. H., and Larimore, O. M.: Action of Bacteriophage upon Production of in Vivo Prepared Toxic Substance of Bacillus Typhosus, Proc. Soc. Exper. Biol. & Med. **26:** 752-754 (June) 1929. Larimore, O. M., and Harris, W. H.: Action of Bacteriophage in Experimental Typhoid Peritonitis, ibid. **26:** 754-756 (June) 1929.
36. Arnold, L., and Weiss, E.: Prophylactic and Therapeutic Possibilities of the Twort-d'Herelle's Bacteriophage, J. Lab. & Clin. Med. **12:** 20-31 (Oct.) 1926.
37. Walker, J. E.: Protective Effect of Bacteriophage Against Simultaneous Injection of Colon Bacilli, J. Infect. Dis. **45:** 73-78 (July) 1929.
38. Compton, A.: (*a*) Sensitization and Immunization with Bacteriophage in Experimental Plague, J. Infect. Dis. **43:** 448-457 (Nov.) 1928; (*b*) Immunization in Experimental Plague by Subcutaneous Inoculation with Bacteriophage; Comparison of Plain and Formaldehyde-Treated Phagelysed Plague Vaccine, J. Infect. Dis. **46:** 152-160 (Feb.) 1930.
39. Flu, P. C.: Der Antipestbakteriophag und die Prophylaxe und Therapie der experimentellen Pest, Zentralbl. f. Bakteriol. **113:** (abt. 1) 468-473 (Aug. 31) 1929.
40. Naidu, B. P. B., and Avari, C. R.: Bacteriophage in Treatment of Plague, Indian J. M. Research **19:** 737-748 (Jan.) 1932.
41. Kabéshima, Tamezo: Bactériologie: Thérapie expérimentale des porteurs de germes, Compt. rend. Acad. d. sc. **170:** 71-75, 1920.
42. Marcuse, K.: Grundlagen und Aufgaben der Lysintherapie, (d'Hérelle's Bakteriophagen), Deutsche med. Wchnschr. **50:** 334-336 (March 14) 1924.
43. Walker, J. E.: Effect of Bacteriophage in Experimental Staphylococcus and Streptococcus Skin Infections, South M. J. **24:** 1087-1089 (Dec.) 1931.
44. Kolmer, J. A., and Rule, Anna: A Note on the Treatment of Experimental Streptococcus Meningitis of Rabbits with Bacteriophage, J. Lab. & Clin. Med. **18:**1001-1003 (July) 1933.
45. Colvin, M. G.: Relationship of Bacteriophage to Natural and Experimental Diseases of Laboratory Animals, with Special Reference to Lymphadenitis of Guinea-Pigs, J. Infect. Dis. **51:** 17-29 (July-Aug.) 1932.
46. Topley, W. W. C.; Wilson, J., and Lewis, E. R.: Rôle of Twort-d'Herelle Phenomenon in Epidemics of Mouse-Typhoid, J. Hyg. **24:** 17-36 (July) 1925.
47. Pyle, N. J.: Bacteriophage in Relation to Salmonella Pullora Infection in Domestic Fowl, J. Bact. **12:** 245-261 (Oct.) 1926.

inhibitory in vivo conditions, no extensive lysis or destruction of bacteria by bacteriophage has been demonstrated.

3. *Bacteriophage Therapy in Human Infections.*—The many reports of good results from the use of bacteriophage in human infections make it difficult to assert that lytic filtrates of bacterial cultures are without effect in the treatment of suitable cases. However, most of the work reported has been done without adequate controls, and consequently the results obtained are difficult to evaluate. It has been the general experience in medical research that therapeutic agents which are effective in human disease have previously been found effective in suitably conducted laboratory experiments on animals. This is not the case with the bacteriophage. In the previous section it has been pointed out that controlled therapeutic experiments with the bacteriophage in both artificially induced and spontaneous infections in animals have generally failed; and as will be seen in the following review, in the few instances in which various investigators have used adequate controls during the treatment of human diseases with bacteriophage the results have usually indicated no therapeutic effect.

In the many clinical trials of the bacteriophage in various infections, most of the results have been judged on a previous conception or knowledge of the clinical course of the disease, and many of the diseases treated were self limiting and nonfatal. This may to a large extent account for the conflicting views as to the therapeutic value of the bacteriophage. d'Herelle [48] has explained most of the failures in bacteriophage therapy as being due to the use of bacteriophage which was not active or "virulent" enough to destroy the infecting organism. For this reason in vitro lysis of the infecting organism by the bacteriophage should always be demonstrated, preferably before the agent is used in treatment.

Many of the conflicting results reported may also be due to differences in the mode or frequency of administration. Bacteriophage has been administered intracutaneously, subcutaneously, intravenously, by mouth, by rectum and by local applications such as wet dressings or irrigations, depending on the nature and location of the infection. For example, in enteric diseases one investigator may use the oral route, another subcutaneous injection, and a third intravenous injection. In some cases large amounts of bacteriophage, up to 100 cc., are administered at frequent intervals, in others only 1 or 2 cc. is injected every twenty-four to forty-eight hours.

The question of the fate of the bacteriophage after injection into the animal body is answered in part by experiments of Appelmans [49] and of Nungester and Watrous.[50] Appelmans observed that bacteriophage is not absorbed from the digestive tracts of normal animals. When injected, it is rapidly eliminated in the urine and feces. Only traces can be detected in the heart, liver, lungs, testicles and blood after twenty-four hours. The bacteriophage appears to accumulate in considerable quantities in the spleen and can be detected there five days after injection. Nungester and Watrous have confirmed these observations and noted a large accumulation of bacteriophage in the spleen two hours after injection. These experiments do not take into consideration the effects of the presence of susceptible infecting organisms, which may act as carriers of the bacteriophage and affect its distribution. Inflammatory processes also appear to affect the distribution of bacteriophage, as shown by the experiments of Eliava [33] and Sumyoshi.[51] The latter investigator fed bacteriophage to guinea-pigs and then induced a peritoneal inflammation by injection of bacteria. The demonstration of the lytic principle in the exudate indicated that it had passed from the intestine to the peritoneum. Eliava cites an experiment in which bacteriophage injected into the blood stream was detected after three hours in the peritoneal exudate produced by injection of sterile broth. Control guinea-pigs were negative for bacteriophage.

The therapeutic effects reported may or may not have been due to bacteriophage itself. Owing to the complexity of the lytic filtrates employed, the effects in one disease may have been due to the action of entirely different factors from those in another disease. Both in animal and in human experiments very few attempts have been made to control the results by the use of nutrient broth alone, the use of culture filtrates without bacteriophage, or the use of lytic filtrates in which the bacteriophage has been destroyed. Furthermore, as already reported, the action of the bacteriophage on bacteria is by no means limited to lysis of the organisms. These questions will be discussed in greater detail in connection with the review of the literature on bacteriophage therapy.

Bacteriophage in Staphylococcic and Streptococcic Infections.—A great many of the reported favorable results of bacteriophage therapy have come from the use of this agent in staphylococcic infections. The difficulty in obtaining active polyvalent bacteriophage for many of the streptococcus strains has precluded its use to some extent in infections with this organism. The infections treated have been local and the generalized infections, bacteremia and septicemia.

Since it is well known that septicemias caused by the pyogenic cocci have a mortality of from 40 to 50 per cent, these cases would seem to present suitable clinical material for testing the therapeutic value of the bacteriophage. The severity of these cases, however, varies between that of a mild bacteremia and that of a severe septicemia. It must be remembered also that in these cases the blood undoubtedly inhibits the lysis of the bacteria, that a concentration of bacteriophage in the blood great enough to produce lysis is probably seldom if ever reached,[8] and that the absence or slowness of multiplication of the bacteria in the blood stream makes regeneration of the bacteriophage negligible.

Despite these facts, results considered by the authors to be favorable have been reported for the use of bacteriophage in blood stream infections with staphylococcus and streptococcus. Brulé and Sauvé [52] have reported the cure of a case of staphylococcic septicemia following one injection of bacteriophage and a blood transfusion. Schultz [53] reports that ten cases of septicemia were treated by intravenous injection of bacteriophage "with remarkable results in several cases." These reports are too limited to be convincing. MacNeal and Frisbee [54] have reported a series of fifteen

48. d'Herelle, Felix: The Bacteriophage and Its Clinical Applications, Springfield, Ill., Charles C. Thomas, 1930; translated by G. H. Smith.
49. Appelmans, R.: Le bactériophage dans l'organism, Compt. rend. Soc. de biol. **85**: 722-724, 1921.
50. Nungester, W. J., and Watrous, R. M.: Accumulation of Bacteriophage in Spleen and Liver Following Its Intravenous Inoculation, Proc. Soc. Exper. Biol. & Med. **31**: 901-905 (May) 1934.
51. Sumyoshi, Y.: Bauchhöhlenexsudat und Bakteriophage, Ztschr. f. Immunitätsforsch. u. exper. Therap. **39**: 377-382, 1924.
52. Brulé and Sauvé: Un cas de staphylococcémie grave guéri par le bactériophage intraveineux, Bull. et mém. Soc. nat. de chir. **58**: 491-494 (March 19) 1932.
53. Schultz, E. W.: Bacteriophage: Possible Therapeutic Aid in Dental Infections, J. Dental Research **12**: 295-310 (April) 1932.
54. MacNeal, W. J., and Frisbee, Frances C.: Bacteriophage as a Therapeutic Agent in Staphylococcus Bacteremia, J. A. M. A. **99**: 1150-1155 (Oct. 1) 1932.

(March 14) 1924.
43. Walker, J. E.: Effect of Bacteriophage in Experimental Staphylococcus and Streptococcus Skin Infections, South M. J. **24**: 1087-1089 (Dec.) 1931.
36 (July) 1925.
47. Pyle, N. J.: Bacteriophage in Relation to Salmonella Pullora Infection in Domestic Fowl, J. Bact. **12**: 245-261 (Oct.) 1926.

cases of staphylococcic bacteremia treated by intravenous injection at frequent intervals of an asparagine preparation of bacteriophage which was low in protein content to avoid serious reaction. More recently MacNeal, Frisbee and Applebaum [55] have reported the occurrence of at least one serious reaction from the use of asparagine bacteriophage preparations by intravenous injection in B. coli septicemia. Several of these cases were also treated by transfusion and by local application of bacteriophage at the site of infection. Of the fifteen patients treated, eight died. MacNeal and Frisbee [54] report that previous to 1929 all patients with staphylococcic bacteremia seen by them who gave two successive positive blood cultures invariably died. They believe that the action of the bacteriophage is not due to lysis but to sensitization of the bacteria, so that they are more susceptible to the immune action of the body fluids and to phagocytosis. Dutton [56] reports that he has treated twelve cases of staphylococcic bacteremia with eleven recoveries and only one death. Of these twelve cases, five might not have been, in the opinion of Dutton, true septicemias. Rice [57] reports that two patients with staphylococcic septicemia treated by subcutaneous injection of bacteriophage died. Stout [58] reports two cases of staphylococcic septicemia, in one of which the patient was not treated by bacteriophage and recovered, and one treated also recovered. Dutton [56] has reported the results of the treatment of streptococcic septicemia. Of fifteen patients not treated by bacteriophage seven died, and of forty patients treated by bacteriophage only eleven died. This represents a reduction in mortality from approximately 46 to 28 per cent.

The series of cases cited are probably not large enough to have statistical significance, but all the authors believe that the bacteriophage is of value in the treatment of septicemia. However, the results are not entirely convincing, since it is known that the mortality in these conditions is probably not over 40 to 50 per cent and in the most detailed report, that of MacNeal and Frisbee,[54] the mortality of the treated cases is just over 50 per cent.

The cure of one case of staphylococcic meningitis is reported by Schless.[59] After an intensive review of the literature this author concludes that true staphylococcic meningitis is invariably fatal. In the case reported the purulent spinal fluid showed a pure culture of Staphylococcus aureus on three successive days, the blood culture remaining negative. Intraspinal administration of bacteriophage (from 10 to 40 cc.) was followed in twenty-four hours by negative spinal fluid cultures, disappearance of toxic symptoms and loss of rigidity. The results indicate that actual lysis of the organisms in the subarachnoid space might have occurred. Since the blood cultures were always negative it seems evident that the infection was limited to the meninges. Stout [58] also reports treating two patients suffering from staphylococcic meningitis with bacteriophage. Both patients recovered, but this author gives no details.

In the bacteriophage treatment of local staphylococcic infections the results are difficult to evaluate because of the tendency of such lesions to heal spontaneously. In the pyodermias, such as furunculosis, carbuncle and acne, favorable results have been reported in a large series of cases by a number of investigators. Gratia [60] was among the first to recommend bacteriophage for the treatment of staphylococcic infections. Therapeutic observations on experimental animals and in human cases by this author indicated that the lytic agent accelerated the cure of these conditions. Bruynoghe and Maisin,[61] and Gougerot and Peyre [62] also reported favorable results in furunculosis, acne and sycosis. In the treatment the bacteriophage was injected into and around the lesions and also applied in the form of wet dressings to the lesions, which had been previously opened. In these early cases all the authors reported that a marked local reaction followed the application of the bacteriophage and that this was followed by a liquefaction of the pus and regression of the infection in from twenty-four to forty-eight hours. Grenet and Isaac-Georges [63] reported that thirty-eight of forty cases of furunculosis responded favorably to bacteriophage therapy, with only two or three recurrences.

In the more recent literature of bacteriophage therapy of pyodermias in America a great many favorable results have been recorded. Schultz,[53] in summarizing the results of treatment by physicians in California, gives the following statistics:

Of sixty-three cases of furunculosis, forty-four "helped" by bacteriophage.

Of sixteen cases of carbuncle, fourteen healed rapidly by bacteriophage.

Of twenty-nine cases of acne, fifteen recovered after application of bacteriophage.

In this series only effects that appeared from twenty-four to seventy-two hours after the administration of the bacteriophage were considered. Crutchfield and Stout [64] report that the clinical results of treatment of fifty-seven patients with staphylococcic skin infection were much better than in similar cases in which other means of treatment were used. In a later report Stout [58] gives the following summary of cases treated by bacteriophage:

The treatment of boils was successful in 85 per cent.

The treatment of generalized furunculosis was successful in 75 per cent.

The treatment of chronic recurrent furunculosis was successful in 60 per cent.

The treatment of carbuncles gave inconsistent results.

In impetigo neonatorum, twenty-four cases were cured in from twenty-four to forty-eight hours with treatment.

In impetigo, sixty cases showed good results from early treatment.

Acne and sycosis were rarely affected by bacteriophage therapy.

Although the number of cases of each disease is not mentioned, Stout states that the whole series included about 1,500 cases. Boyce, Lampert and McFetridge [65]

55. MacNeal, W. J.; Frisbee, Frances C., and Applebaum, Martha: Therapeutic Use of Bacteriophages Against the Colon Bacillus, Arch. Surg. **29**: 242-247 (Aug.) 1934.
56. Dutton, L. O.: Therapeutic Use of Bacteriophage, with Special Reference to Staphylococcus Septicemia, Southwestern Med. **17**: 374-379 (Nov.) 1933.
57. Rice, T. B.: Use of Bacteriophage Filtrates in Treatment of Suppurative Conditions: Report of 300 Cases, Am. J. M. Sc. **179**: 345-360 (March) 1930.
58. Stout, B. F.: Bacteriophage Therapy, Texas State J. Med. **29**: 205-209 (July) 1933.
59. Schless, R. A.: Staphylococcus Aureus Meningitis: Treatment with Specific Bacteriophage, Am. J. Dis. Child. **44**: 813-822 (Oct.) 1932.

60. Gratia, A.: La lyse transmissible du staphylocoque: Sa production; ses applications thérapeutiques, Compt. rend. Soc. de biol. **86**: 276-278, 1922.
61. Bruynoghe, R., and Maisin, J.: Essais de thérapeutique au moyen du bactériophage, Compt. rend. Soc. de biol. **85**: 1120-1121, 1921.
62. Gougerot, H., and Peyre, E.: Bacteriophage in Treatment of Skin Diseases, Compt. rend. Soc. de biol. **91**: 452-453 (July 18) 1924.
63. Grenet, H., and Isaac-Georges, P.: Quelques essais thérapeutiques à l'aide du bactériophage de d'Hérelle, Presse méd. **36**: 1089-1092 (Aug. 29) 1928.
64. Crutchfield, E. D., and Stout, B. F.: Treatment of Staphylococcic Infections of the Skin by the Bacteriophage, Arch. Dermat. & Syph. **22**: 1010-1021 (Dec.) 1930.
65. Boyce, F. F.; Lambert, R., and McFetridge, E. M.: Bacteriophagy in Treatment of Infections of Superficial and Deep Tissues, with Report of 200 Cases, New Orleans M. & S. J. **86**: 158-165 (Sept.) 1933.

30. Nungester, W. J., and Watrous, R. M.: Accumulation of Bacteriophage in Spleen and Liver Following Its Intravenous Inoculation, Proc. Soc. Exper. Biol. & Med. **31**: 901-905 (May) 1934.

54. MacNeal, W. J., and Frisbee, Frances C.: Bacteriophage as a Therapeutic Agent in Staphylococcus Bacteremia, J. A. M. A. **99**: 1150-1155 (Oct. 1) 1932.

report the treatment of thirteen cases of furunculosis and twenty-seven cases of carbuncle, and Alderson [66] reports the treatment of ten cases of acne vulgaris and furunculosis by bacteriophage with good results. Kahn [67] found that in nine cases of acne and five cases of furunculosis the use of stock polyvalent bacteriophage produced a "50 to 90 per cent" improvement and was effective even in cases in which every other treatment had failed. He notes prompt healing of the lesions, the abortion of some boils, and the liquefaction of pus in others. Cipollaro and Sheplar [68] review a series of 108 cases of pyodermias treated by them. Of these cases, sixty-two were furunculosis in all but fourteen of which treatment was completed with cure. They believe that the effects in recurrent multiple furunculosis may be due to an immunity conferred by the bacteriophage. They consider surgery the method of choice in solitary boils in which the pus is encapsulated. In five cases of carbuncle Cipollaro and Sheplar obtained good results, noting that the pus is liquefied, toxemia and pain reduced, and recovery more prompt than when incision and drainage are used. They report fair results in the treatment of twenty-eight cases of sycosis vulgaris, only seven of their patients having failed to show any improvement. These authors also note local and general reactions from the injection of bacteriophage, usually followed by marked improvement in the condition of the patient.

Larkum [69] has presented the data collected by the Michigan Department of Health on the treatment of 208 cases of furunculosis by bacteriophage. In these cases the same polyvalent strain of bacteriophage was used throughout. The preparation contained the equivalent of five billion staphylococci per cubic centimeter. Treatment consisted of injection of 2 cc. subcutaneously on two successive days. Local applications were not used in furunculosis. The author summarizes the results first in groups according to the previous duration of the disease. This summary indicates that the previous duration makes no difference in the results. The general summary is given in table 2.

Larkum states that in thirteen instances patients cured by bacteriophage had previously failed to respond to autogenous vaccines. Of twenty-three cases of acne treated by bacteriophage, two were cured, eight improved and thirteen failed to respond. Rice [57] has also treated a large series of cases of staphylococcic infections. Stock bacteriophages were used for all except the first fifty cases. Cultures from cases which failed to respond were generally found to be resistant organisms. Several cases were treated with peptone broth, with some improvement but no striking effects. Sixty-six cases of boils and carbuncles were treated, with "excellent results" in fifty-five, intermediate results in five, failure in five, and no report in one. Four of the failures could be ascribed to the fact that the causative organism was not susceptible to the bacteriophage used. Wet dressings were used in a great number of cases, and subcutaneous injection was used in some. Thirty-five cases of acne were treated, with thirteen "excellent results," eight "fair" results, seven with no effect, and treatment was incomplete in seven. In these cases the bacteriophage was applied in 1 per cent agar jelly. Both Rice and Larkum are inclined to the view that factors other than the lysis of the bacteria may play a part in the healing of the lesions. Larkum believes that many of the cures may be due to immunization with a readily available antigen. Rice, on the other hand, reports almost equally good results in cases that have been treated by wet dressings, or local instillation into the lesion, without the use of filtrates as a vaccine. In cases in which striking effects were reported to have occurred between twenty-four and forty-eight hours it is difficult to account for the improvement as being the result of active immunity.

In the treatment of osteomyelitis by bacteriophage, the reports have been generally less enthusiastic than those in the treatment of pyodermias. In osteomyelitis, streptococcus as well as staphylococcus may play an important rôle. Since no potent polyvalent bacteriophages are available for streptococci, attempts to treat streptococcic bone infections with bacteriophage might be expected to meet with little success. In most of the cases reported the ordinary methods of surgical intervention have been used along with the bacteriophage therapy. Bagley and Keller [70] report treating ten cases of osteomyelitis with bacteriophage. Three cases in which infecting organisms other than staphylococcus were present were treated only with bacteriophage dressing. None of these cases showed improvement. Three cases, complicated by septicemia, were treated by dressings and by intravenous injection of bacteriophage. Severe reactions followed the intravenous injections in all these cases. Two of the patients died, one recovered. Four cases of uncomplicated staphylococcic osteomyelitis were treated by bacteriophage, wet dressings and subcutaneous and intramuscular injections being used. Three showed good results; one patient died of meningitis extending from osteomyelitis of the skull. The authors mentioned that uncomplicated cases of osteomyelitis respond best to other forms of treatment. Boyce, Lampert and McFetridge [65] report that the bacteriophage treatment of ten cases of osteomyelitis produced some relief but no striking effects. Rice [57] states that in eleven cases of osteomyelitis bacteriophage therapy gave excellent results in four, fair results in three, and no effect in four. He is of the opinion that the value of bacteriophage is less in this condition than is indicated by these figures. It has no value when

TABLE 2.—*General Summary in Larkum's Series*

Patients treated	208	
No recurrences 6 months after treatment	88	
No recurrences from 6 weeks to 6 months after treatment	61	
No recurrences less than 6 weeks after treatment	13	
Total number of patients showing no recurrences immediately to more than 6 months after treatment	162	(78 per cent)
Recurrences	46	(19 per cent)
Mild recurrences which later cleared up	30	
Improved but occasional recurrences	10	
No improvement	6	(3 per cent)
Reactions observed as follows:		
None	60	
Mild	72	
General	15	
Severe	2	
No report	56	

66. Alderson, H. E.: Bacteriophage in Pyogenic Infections of Skin, Arch. Dermat. & Syph. **21**: 197-205 (Feb.) 1930.

67. Kahn, B. L.: Bacteriophage Therapy for Pyodermia: Report of Twenty Cases, Arch. Dermat. & Syph. **24**: 218-227 (Aug.) 1931.

68. Cipollaro, A. C., and Sheplar, Adele E.: Therapeutic Uses of Bacteriophage in Pyodermias, Arch. Dermat. & Syph. **25**: 280-293 (Feb.) 1932.

69. Larkum, N. W.: Bacteriophage Treatment of Staphylococcus Infections, J. Infect. Dis. **45**: 34-41 (July) 1929.

70. Bagley, E. C., and Keller, Margaret: Bacteriophage in Treatment of Osteomyelitis; Study of Ten Cases, Including Three Cases Complicated by Staphylococcus Aureus Septicemia, Minnesota Med. **15**: 597-601 (Sept.) 1932.

59. Schless, R. A.: Staphylococcus Aureus Meningitis: Treatment with Specific Bacteriophage, Am. J. Dis. Child. **44**:813-822 (Oct.) 1932.

in Treatment of Infections of Superficial and Deep Tissues, with Report of 200 Cases, New Orleans M. & S. J. **86**: 158-165 (Sept.) 1933.

dead bone is present in the lesion. MacNeal [71] and Larkum [68] report favorable results in the treatment of a small series of cases. Albee [72] states that in about 94 per cent of cases of acute and chronic osteomyelitis observed by him a specific bacteriophage occurs spontaneously. He believes that the efficacy of the Orr closed treatment for osteomyelitis, in which the wound is closed without antiseptics and the dressings remain long undisturbed, is due to the spontaneous development of bacteriophage. This is merely a reiteration of d'Herelle's theory [73] of the rôle of bacteriophage in immunity to infectious disease, a theory that at present lacks experimental support.

(To be continued)

Council on Physical Therapy

THE FOLLOWING REPORT WAS SUBMITTED TO THE BOARD OF TRUSTEES OF THE AMERICAN MEDICAL ASSOCIATION AT A JOINT MEETING OF THE TRUSTEES AND THE COUNCIL, HELD IN CHICAGO, SEPT. 17, 1934. THE TRUSTEES EXPRESSED THE VIEW THAT THIS REPORT MIGHT WELL BE PUBLISHED FOR THE BENEFIT OF THE ENTIRE PROFESSION, IN ORDER THAT THE PHYSICIANS OF THE COUNTRY MIGHT BETTER UNDERSTAND THE PURPOSE OF THE COUNCIL, ITS AIMS, ACCOMPLISHMENTS AND PLANS FOR THE FUTURE.

H. A. CARTER, Secretary.

REPORT OF THE COUNCIL ON PHYSICAL THERAPY

The Council came into existence as the result of a resolution adopted by the House of Delegates in 1925. The members of the Council were appointed by the Trustees during the fall of 1925. The Council held its first meeting in January 1926. The Council has been actively in existence for eight years.

Physical therapy was in a chaotic condition at the time of the organization of the Council by the Trustees. During the war physical therapy had been elevated from the realm of quackery, but by 1926 it bid fair to lead many of our profession back into the realm of quackery. It was recognized as having many excellent attributes of therapeutic value by the majority of the profession, while at the same time it was frowned on by many of the conservative men of the profession as being tainted with quackery.

At this time only a few hospitals had adequate physical therapy departments, and only a few physicians were employing it solely for the welfare of their patients. The chaos that existed was due to the activities of manufacturing agents who were selling apparatus directly to the physicians and to hospitals for "machine therapy." A few manufacturers were sending physicians of questionable repute throughout the country to hold clinics for the purpose of demonstrating machines that would deliver certain forms of physical therapy, for which all kinds of unwarranted and unsupported therapeutic claims were made. The profession was rapidly losing sight of the fact that true physical therapy consisted chiefly of intelligent hand work—namely, heat, massage and exercise—and that expensive machines and apparatus played a minor part in the realm of physical therapy so far as the majority of the profession was concerned.

With the foregoing conditions confronting the newly formed council, it can be readily understood that the first two or three years of the Council's existence were devoted to self education of its members; to formulating rules of procedure that could withstand all criticism; and to months—even years—of study of certain physical phenomena used in physical therapy before it could refute or approve the therapeutic claims made by certain manufacturers. This was a new field in therapeutics to the Council members as well as to most of the members of the profession, and of necessity they had to move surely and cautiously if the work of the Council was to be permanent. It is with a sense of real accomplishment that the Council presents the following outline:

I. The Council—its organization and activities relating to physical therapy apparatus.

A. The Council consists of twelve men: one internist, two physiologists, one pathologist, one physicist, one radiologist, one dermatologist, two orthopedic surgeons, one general surgeon, and two physical therapists.

Six of the original members appointed by the Council are still active. Two of the Council members were lost by death and four by resignation; two were not reelected; their places were immediately filled by others appointed by the Trustees.

B. The Council has prepared and adopted:

1. Official Rules and requirements for submission of apparatus.
2. Minimum standards for acceptance of apparatus; e. g.,
   (*a*) Regulations to Govern the Advertising of Ultraviolet Generators to the Public and to the Medical Profession.
   (*b*) Acceptance of Sunlamps.
   (*c*) Diathermy: A Preliminary Statement to the Acceptance of Diathermy Apparatus.

C. The Council has developed a list of definitions and nomenclature by cooperating with the American Standards Association. This is the first complete list of nomenclature for which the definitions of the terms correspond with the similar terms in use by physicists, engineers and other scientists.

D. The Council has secured the services of leading physicists, physiologists, clinicians and others, who have served as consultants and as investigators of apparatus.

E. The Council has made extensive study and investigation of ultraviolet, visible and infra-red radiation and has corrected many of the abuses of radiation therapy due to the lack of familiarity in the profession concerning this form of treatment. The Council has

1. Investigated a great many types of ultraviolet lamps and developed the emission standards for certain grouping of lamps.
2. Has developed and adopted ultraviolet radiation dosage units in general use in the United States.
3. Has developed and adopted standards for the control of ultraviolet radiation advertising to the profession and to the public.
4. Has conducted investigations into x-ray and radium products and therapeutic practices.

F. The Council has cooperated with the American Standards Association, working with the American Society of Ventilating Engineers in the investigation of air conditioning and health claims in connection therewith.

G. The Council has cooperated with the Council on Medical Education of the American Medical Association, the American Orthopedic Association, the American Congress of Physical Therapy and the American Physiotherapy Association, (technicians) and the American Occupational Therapy Association, in developing standards for the education of technicians.

H. The Council has published sixty-two articles, which have dealt chiefly with those physical therapy procedures most applicable to the work of the general physician; which have refuted many false therapeutic claims for certain physical therapy apparatus, and which have otherwise endeavored to place physical therapy on a sound basis. Many

71. MacNeal, W. J.: Bacteriophages as Help in Treatment of Infections in Children, New York State J. Med. **31**: 1383-1386 (Nov. 15) 1931.

72. Albee, F. H.: Will Bacteriophage Prove Ideal Wound Treatment? Am. J. Surg. **15**: 228-236 (Feb.) 1932.

73. d'Herelle, Felix: Immunity in Natural Infectious Disease, Baltimore, Williams & Wilkins Company; translated by G. H. Smith, 1924.

tions, J. Infect. Dis. 45: 34-41 (July) 1929.

601 (Sept.) 1932.

of these articles have been included in the Handbook of Physical Therapy.

I. The Council has edited and published a Handbook of Physical Therapy.

II. Apparatus: The Council

A. Has formally considered 290 pieces of apparatus.

B. Has accepted 130 pieces of apparatus.

C. Has published the rejection of seventeen pieces of apparatus.

D. Has 143 pieces of apparatus still under consideration. A large portion of these have been investigated and rejected, but at the request of the manufacturers the publication of these reports has been postponed while the firms are gathering better evidence.

E. Has withdrawn acceptance of one product.

F. Has refused to consider about 100 mechanical nostrums.

G. Has investigated, standardized and suggested improvements in anesthesia, resuscitation and oxygen therapy equipment. Under these heads fifteen pieces of apparatus have been accepted.

H. Has cooperated with the Section on Ophthalmology of the American Medical Association in the investigation of lenses and ophthalmologic devices.

I. Has investigated certain ear-exercising devices, many pollen-removing appliances, all kinds of mechanical exercisers, belts, pads, electric blankets, and innumerable other devices with questionable health values.

III. Advertising: The Council

A. Has assisted in raising the tone of advertising matter and has been instrumental in the improvement of merchandising methods.

1. By reading, revising and in many cases completely eliminating approximately 5,000 separate pieces of advertising material.

2. By securing the cooperation of the better manufacturers.

3. From the standpoint of physicians, hundreds of letters have been received showing their favorable reaction to improved advertising and merchandising methods.

B. Has eliminated "clinics" that were conducted by manufacturers for the demonstration of their apparatus.

C. Has eliminated almost completely the giving of lectures throughout the country by physicians of questionable repute, employed by manufacturers.

IV. Education: The Council has devoted much time to the education of the medical profession in physical therapy.

A. By preparing standards for undergraduate and postgraduate education in physical therapy.

B. By supplying speakers to state or county medical societies.

C. By the Council members presenting papers before many representative medical associations in the United States.

D. By formulating a method for extending postgraduate education.

E. The Council has arranged for exhibits in physical therapy in conjunction with the Committee on Scientific Exhibit at the Annual Session of the American Medical Association. It has likewise presented scientific exhibits before the Association of American Railway Surgeons, American Congress of Physical Therapy, American Academy of Orthopedic Surgery, Illinois State Medical Society, Medical Society of the State of New York, Mid-South Post-Graduate Medical Assembly, Kentucky State Medical Association and the Medical Society of the State of Pennsylvania.

From the foregoing summary of past work of the Council, it can be authoritatively stated that physical therapy is now in much better repute with the entire profession than it was at the time the Council was organized. Then justifiable skepticism was warranted by the misuse of physical therapy. Today patients are receiving more and more of that type of physical therapy that is of real value to them.

V. How work is conducted:

A. The Council has held from one to two meetings a year, and the Special Committee of the Council, consisting of three members, has met several times each year. More than 90 per cent of the work of the Council is carried on by a Bulletin sent to the members every two weeks.

VI. Future aims of the Council:

A. There is still a great amount of work to be done, and its future activities will be directed chiefly along the lines indicated by the foregoing outline, but over a broader field. For example, the Council is undertaking the consideration of diagnostic machines, belts, supports and radium products.

B. The Council feels that there is need for greater efforts in graduate teaching throughout the country. Therefore a more extensive plan has been developed whereby speakers may be furnished to county and state medical meetings.

C. The Council will continue to guard zealously this field of physical therapy in order to prevent all irregular practices and to strive to enlarge its scope and usefulness for the benefit of the profession and the public at large.

Council on Pharmacy and Chemistry

NEW AND NONOFFICIAL REMEDIES

THE FOLLOWING ADDITIONAL ARTICLES HAVE BEEN ACCEPTED AS CONFORMING TO THE RULES OF THE COUNCIL ON PHARMACY AND CHEMISTRY OF THE AMERICAN MEDICAL ASSOCIATION FOR ADMISSION TO NEW AND NONOFFICIAL REMEDIES. A COPY OF THE RULES ON WHICH THE COUNCIL BASES ITS ACTION WILL BE SENT ON APPLICATION.

PAUL NICHOLAS LEECH, Secretary.

DIOTHANE. — Diothane Hydrochloride. — Piperidinopropanediol-*di*-phenylurethane hydrochloride. — $C_5H_{10}N.CH_2CH(OCONHC_6H_5)\ CH_2(OCONHC_6H_5).HCl$.—The hydrochloride of the base piperidino-propanediol-*di*-phenylurethane, obtained by combining piperidine and glycerol monochlorohydrin in the presence of an alkali, and reacting the piperidinopropanediol with phenyl *iso*cyanate.

Actions and Uses.—Nearly similar to those of cocaine, but it is claimed that the anesthesia lasts somewhat longer than that induced by corresponding doses of cocaine or procaine. Its toxicity by intravenous injection is about three times that of procaine, and hence it should not be injected except in very small amounts.

Solutions prepared extemporaneously should be used promptly, since such solutions usually contain traces of alkali and are thereby subject to precipitation.

Manufactured by the Wm. S. Merrell Company, Cincinnati. U. S. patent applied for. U. S. trademark 296,850.

Diothane Ointment, 1%: An aqueous solution of diothane, 1 per cent, in an oxycholesterin base.

Diothane Solution, 1%: A solution of diothane, 1 per cent, in distilled water.

Diothane hydrochloride occurs as a fine, white crystalline, odorless powder; when applied to the tongue, it possesses a bitter taste followed by a sense of numbness; permanent in the air at ordinary temperatures; slightly soluble in water, acetone and ethyl acetate; soluble in alcohol; insoluble in benzene and ether. Its aqueous solution (1 in 100) is faintly acid to litmus. Diothane hydrochloride melts at 195 to 200 C., with decomposition. From aqueous solutions, alkali carbonates and hydroxides precipitate the free base as a colorless oil, which does not solidify under ordinary conditions.

Dissolve about 0.5 Gm. of diothane hydrochloride in 50 cc. of water; separate portions of 5 cc. each: to one portion add 5 cc. of silver nitrate

73. d'Herelle, Felix: Immunity in Natural Infectious Disease, Baltimore, Williams & Wilkins Company; translated by G. H. Smith, 1924.

to place physical therapy on a sound basis. Many

solution: a white precipitate results, soluble in an excess of ammonia water; to another portion add 0.2 cc. of diluted hydrochloric acid, 0.2 cc. of a 10 per cent solution of sodium nitrite and gradually mix with a solution of 0.2 Gm. of betanaphthol in 10 cc. of a 10 per cent sodium hydroxide solution: a white, changing to a yellowish and finally to an orange color appears, increasing in intensity as the concentration of the betanaphthol becomes greater (*distinction from the anesthetics responding to the diazo-reaction*); to another portion add 5 drops of gold chloride solution: an orange-yellow precipitate appears (*distinction from alypin, apothesine, cocaine, metycaine and nupercaine, which give a lemon-yellow precipitate and butyn, procaine and tutocaine, which yield brown precipitates*). Dissolve about 0.1 Gm. of diothane hydrochloride in 1 cc. of sulphuric acid: the solution is colorless (*readily carbonizable substances*). Saturate about 0.1 Gm. of diothane hydrochloride dissolved in 10 cc. of water with hydrogen sulphide: no coloration or precipitation results (*salts of heavy metals*).

Dry about 0.5 Gm. of diothane hydrochloride, accurately weighed, at 100 C. for six hours: the loss in weight does not exceed 0.5 per cent. Incinerate about 0.5 Gm. of diothane hydrochloride, accurately weighed: the residue is not more than 0.1 per cent. Transfer about 0.3 Gm. of diothane hydrochloride, accurately weighed, to a 500 cc. Kjeldahl flask, and determine the nitrogen content according to the official method described in Official and Tentative Methods of Analysis of the Association of Official Agricultural Chemists, third edition, page 20, chapter 2, paragraph 22: the percentage of nitrogen corresponds to not less than 9.5 per cent, nor more than 9.8 per cent when calculated to the dried substance. Dissolve about 0.25 Gm. of diothane hydrochloride, accurately weighed, in 25 cc. of water, by warming, and transfer to a suitable Squibb separatory funnel, rinse twice using about 10 cc. of water, followed by the addition of 3 cc. of a diluted ammonia water (one part of ammonia water and ten parts of water), extract with four successive portions of ether using 20 cc. each; filter through a pledget of cotton and evaporate to a thick oil in a stream of warm air; dissolve the oily residue in about 25 cc. of previously neutralized alcohol; warm slightly; add 10 cc. of tenth-normal hydrochloric acid solution, followed by the addition of 10 cc. of water; determine the excess of acid by titration with tenth-normal sodium hydroxide solution, using bromphenol blue as an indicator: the amount of tenth-normal hydrochloric acid consumed corresponds to not less than 90.5 per cent nor more than 92 per cent of piperidinopropanediol-*di*-phenylurethane when calculated to the dried substance. Transfer the ammoniacal aqueous portion from the foregoing immiscible solvent extraction to a 400 cc. beaker and place on the steam-bath for three hours; add 100 cc. of water, followed by the addition of 10 cc. of nitric acid and 25 cc. of silver nitrate solution; subsequently boil with continuous stirring and allow to cool in a dark place. Collect the precipitate of silver chloride on a Gooch crucible, wash with diluted nitric acid and water, followed by alcohol and ether; finally dry to constant weight at 105 C.; the amount of hydrogen chloride calculated from the silver chloride found corresponds to not less than 8.35 per cent, nor more than 8.45 per cent when calculated to the dried substance.

REPORTS OF THE COUNCIL

THE COUNCIL HAS AUTHORIZED PUBLICATION OF THE FOLLOWING REPORT. PAUL NICHOLAS LEECH, Secretary.

THE "NOTICE OF JUDGMENT" ON SCARLET RED SALVE (HEILKRAFT MEDICAL COMPANY)

A physician recently wrote to THE JOURNAL, asking an explanation of the apparent incongruity of the Council's continued acceptance of Scarlet Red Salve (Heilkraft) after he had read the short abstract of the federal government's notice of judgment, which appeared in THE JOURNAL, July 21, 1934, page 205.

Since the product still has its accepted status in view of the firm's agreement to modify the claims which the Council, as well as the federal government, has found objectionable, no report of the Council's action (which was taken prior to receipt of the physician's inquiry) has been published. In order to clarify the apparent incongruity of the Council's continued acceptance of the product which the government has declared to be marketed under false and fraudulent therapeutic claims, the Council decided to publish the following statement of circumstances:

The following claims appearing on the label or in the package circular formed the basis of the government's action (notice of judgment 20165, June 1933) against the scarlet red salve of the Heilkraft Medical Company:

(Carton) "Causes an active proliferation of the epithelium, and in such chronic conditions as partial skin grafts, ulcers following operation for infection, ulcers following burns, traumatic ulcers, specific ulcers, varicose ulcers, bed sores, and the like, the results have been in many instances nothing short of remarkable. All who have used the agent are enthusiastic in their praise of it"; (circular) "In the treatment of Indolent Varicose Ulcers, Sluggish or Non-granulating Wounds, Sores resulting from various Blood Diseases, Eczema, . . . etc."

New and Nonofficial Remedies, 1934, contains the following statement of the actions and uses of scarlet red medicinal:

Scarlet red medicinal Biebrich and scarlet red sulphonate have a marked power of stimulating the proliferation of epithelial cells.

Opinions are divided as to the clinical value, but the dyes are used to promote the growth of epithelium in the treatment of burns, wounds, chronic ulcers, etc. In chronic ulcers, however, it is requisite that the local circulation be good in order to obtain a permanent result.

On being informed early this year of the government's action declaring Scarlet Red Salve (Heilkraft) misbranded, the Council's referee for the product made a report to the Council, which stated in part:

As some of the statements of claims come within the limits allowed by the Council's opinion according to New and Nonofficial Remedies, 1933, and others have in the past been accepted by the Council, the Council found itself in the embarrassing position of permitting the issuance of claims for a product which the Food and Drug Administration of the United States Department of Agriculture regards as "false and fraudulent."

The Food and Drug Administration was asked to assist the Council by supplying the evidence on which the Administration based its opinion. The administration replied under date of September 28, in part, as follows:

"Our investigations lead us to believe that this preparation is sold very extensively over the drug counter to the general public and not on physicians' prescriptions or upon recommendations from physicians. The type of labeling used with this product would be considered highly extravagant when distributed by this method.

"The product was recommended as of value in ulcers following operations for infections, traumatic ulcers, specific ulcers, indolent varicose ulcers, sores resulting from various blood diseases, eczema, etc. We are of the opinion that such a label is extravagant in its claims even when recommended to a physician. A physician should be capable through his scientific training of judging the type of case in which this preparation would be of value. However, a layman is not capable of determining this. The law as written does not make any differentiation in the labels of preparations that are distributed for physicians' use or for physicians' prescriptions and those sold directly to the public."

This letter is helpful in stating the law, but it does not give the Council the benefit of a knowledge of the evidence on which the opinion of the administration was based. In view of the possibility that the status of therapeutic opinion may have changed since the previous referee examined the literature three years ago, the referee attempted to evaluate the published evidence.

The ability of Scarlet Red (Biebrich) to produce epithelial proliferation was first noted by Fisher in 1906. This was confirmed by others. The results of the careful experimental studies of J. S. Davis in the treatment of ulcers and skin grafts with Scarlet Red were published in the *Bulletin of the Johns Hopkins Hospital* **20:** 186, 1909; **22:** 210, 1911; **23:** 332, 1912; **24:** 178, 1913. These investigations still seem to the referee to prove that the chief component of Scarlet Red, aminoazotoluol, stimulates epithelial proliferation. The referee does not know of any refutation of the work of Fisher, Davis and others. The referee abstracted about ten papers published during the past five or six years reporting good results in treatment of ulcers with Scarlet Red or similar compounds. There has been no experimental work comparable in scope and care with the earlier work. The status of therapeutic opinion, however, does not seem to have changed, if the published papers are an index of that opinion.

It is to be recalled that New and Nonofficial Remedies contains the admission that clinical opinion is divided on the question of the therapeutic value of Scarlet Red. It is obvious also that the Heilkraft Medical Company was at fault in mentioning diseases by name in the trade package circular. The Council readily concurs in the opinion of the Food and Drug Administration that it is extravagant to claim that Scarlet Red can cure ulcers due to serious underlying constitutional or local diseases. The necessity of adequate local circulation is admitted in New and Nonofficial Remedies in connection with the treatment of chronic ulcers, and it is obvious that syphilitic ulcers will not be cured by Scarlet Red. The Council believes that the Food and Drug Administration may not regard as "false and fraudulent" the claim that Scarlet Red stimulates epithelial proliferation unless it has at its disposal undisclosed experimental evidence better than that of Davis and others. It appears that the firm has gone beyond justifiable limits in its specific and unqualified claims. It seems, therefore, that an agreement may be reached on these questions by the three parties concerned by adhering to the conservative statement in New and Nonofficial Remedies.

In transmitting this report to the Heilkraft Medical Company, the Council stated that it would reaccept the firm's product for inclusion in New and Nonofficial Remedies only on condition that the labels and advertising are revised along the following lines: (1) limitation of claims to the stimulating effect of Scarlet Red on epithelial cells, and (2) omission of unqualified claims of benefit in the treatment of traumatic ulcers, infected ulcers, and ulcers associated with systemic disease. The firm has agreed to revise its labels and advertising material in the very near future, in accordance with the stipulations of the Council's report.

Pennsylvania.

Dissolve about 0.5 Gm. of diothane hydrochloride in 50 cc. of water; separate portions of 5 cc. each: to one portion add 5 cc. of silver nitrate

Committee on Foods

ACCEPTED FOODS

THE FOLLOWING PRODUCTS HAVE BEEN ACCEPTED BY THE COMMITTEE ON FOODS OF THE AMERICAN MEDICAL ASSOCIATION FOLLOWING ANY NECESSARY CORRECTIONS OF THE LABELS AND ADVERTISING TO CONFORM TO THE RULES AND REGULATIONS. THESE PRODUCTS ARE APPROVED FOR ADVERTISING IN THE PUBLICATIONS OF THE AMERICAN MEDICAL ASSOCIATION, AND FOR GENERAL PROMULGATION TO THE PUBLIC. THEY WILL BE INCLUDED IN THE BOOK OF ACCEPTED FOODS TO BE PUBLISHED BY THE AMERICAN MEDICAL ASSOCIATION. RAYMOND HERTWIG, Secretary.

KRIM-KO CHOCOLATE FLAVORED DRINK

Bottlers and Distributors.—

Allvine Dairy Company, Kansas City, Kan.
Artic Ice Cream and Milk Company, Cortland, N. Y.
Ashley Dairy Company, Battle Creek, Mich.
Babcock Dairy Company, Toledo, Ohio.
Baker-Hubbell Dairy, Inc., Peoria, Ill.
Banner Creamery, San Angelo, Texas.
Briggs Dairy Products Company, Blackwell, Okla.
Brinkman Dairy Company, Watertown, Wis.
Cedar Grove Dairy, Falls City, Neb.
Central Illinois Dairy Products Co., Peru, Ill.
Citizen's Dairy Company, Springfield, Ohio.
Clover Cream Dairy Products Co., Marshfield, Wis.
Cloverleaf Dairy, Leavenworth, Kan.
Cocumcussoc Farm & Dairy Products, Wickford, R. I.
Colonial Dairy Company, Wood River, Ill.
Connor Dairy Products Company, Coshocton, Ohio.
Consumers Dairy, Holland, Mich.
Cook Brothers Dairy, Elkhart, Ind.
Creighton's Creamery, Elmira, N. Y.
Datson Dairies, Inc., Orlando, Fla.
Dudley Dairy Products Company, Paducah, Ky.
Fenley's Model Dairy, Louisville, Ky.
Florida Milk Company, St. Petersburg, Fla.
Gateway Creamery Company, Joplin, Mo.
Greenwood County Creamery, Eureka, Kan.
Grove Dairy, Urbana, Ohio.
Joy's Creamery, St. Mary's, W. Va.
Lakemont Dairy, Winter Park, Fla.
Landwehr Dairy, Jefferson City, Mo.
Lang's Creamery, Buffalo.
Lawrence Sanitary Milk & Ice Cream Co., Lawrence, Kan.
Little Dairy, Ironwood, Mich.
Massey Dairy, Inc., Granite City, Ill.
Meadolake Products Company, Sherman, Texas.
Missouri Valley Creamery Company, Washington, Mo.
Niles Creamery Company, Niles, Mich.
Nokomis Dairy, Nokomis, Fla.
Oak Grove Dairy, Clinton, Iowa.
Oleander Ice Cream Company, Sarasota, Fla.
Peerless Dairy Company, Rock Island, Ill.
Pinehurst Dairy, Rockford, Ill.
Prairie View Dairy, East Chicago, Ind.
Purvin Dairy Company, Wilkes-Barre, Pa.
Reed's Milk and Ice Cream Company, Shamokin, Pa.
Riverside Dairy, Mishawaka, Ind.
St. Charles Dairy Company, St. Charles, Mo.
Southern Dairies, Inc., Asheville, N. C., and Knoxville, Tenn.
South St. Paul Dairies, Inc., South St. Paul, Minn.
Stephens Brothers, Carbondale, Pa.
Stowell's Dairy, Leroy, N. Y.

Licenser.—Krim-Ko Company, Chicago, manufactures the Krim-Ko Chocolate Flavored Drink Base, and licenses its use, the name Krim-Ko, and standard advertising under definite contract conditions.

Description.—Pasteurized chocolate flavored sweetened skim milk; contains skim milk (from 0.5 to 1.5 per cent milk fat), sucrose, chocolate and cocoa, tapioca flour, salt and traces of tartaric acid and agar; flavored with imitation vanilla extract. See Krim-Ko Chocolate Flavored Drink, THE JOURNAL, June 30, 1934, page 2187.

CHALLENGE BUTTER

Distributor.—Challenge Cream & Butter Association, Los Angeles.

Description.—Packaged, salted, pasteurized butter graded to rate 92 or 93 score by United States Department of Agriculture graders.

Manufacture.—The cream used is largely separated out at the creameries and not on the farms. It is tested for milk fat, acidity, flavor and odor, is pasteurized for thirty minutes at 66 C. and cooled to churning temperature, or, if held over night, chilled below churning temperature. In winter, the maximum acidity (as lactic acid) permitted is 0.2 per cent, in summer 0.25 per cent. Certified food color is added when necessary to maintain a uniform butter color throughout the year. The cream is churned under standard conditions of time and temperature. The buttermilk is drawn off. The butter is washed with water, salt is added and the butter is thoroughly worked to distribute the salt and produce a moisture content of from 16 to 16.5 per cent. Before the butter is removed from the churn it must contain by analysis less than the specified maximum moisture and salt content. The butter is packed at the various creameries either in 68 pound cubes or in packing molds and is shipped under refrigeration to the packaging plants, where it is graded, cut to standard size, wrapped and packed in cartons.

No butter flavors or starters are used. Only occasionally is a neutralizer (sodium bicarbonate) used.

A premium is paid for butter scoring 93. Only 92 to 93 score butter is used for this brand. The grading is done by United States Department of Agriculture graders. The churns are treated with boiling water whenever necessary to destroy micro-organisms that may establish themselves. Code marks on the packages identify the batch of butter, date of churning and packing and the creamery. Laboratory control is maintained to assure that all butter issuing under the brand named "Challenge" fulfils specified requirements.

Analysis (submitted by distributor).—

	(1)	(2)	(3)
Moisture	16.4%	14.5%	16.0%
Milk fat	80.6	82.4	80.7
Curd	0.9	1.1	0.8
Sodium chloride	2.1	2.0	2.4

Calories.—From 7.3 to 7.4 per gram; from 207 to 210 per ounce.

LIBBY'S NATURAL HAWAIIAN PINEAPPLE JUICE

Manufacturer.—Libby, McNeill & Libby, Chicago.

Description.—Hawaiian pineapple juice, retaining in high degree the natural vitamin content.

Manufacture.—Fully matured and sound Hawaiian pineapples are sized to cylindric shape by a revolving cylindric knife, which removes the outer peel; the two ends are mechanically cut off. Any remaining particles of peel are removed by hand. The trimmed pineapples are washed by water sprays and crushed. The pulp is heated and the juice is expressed in a continuous press in an atmosphere of steam, screened, canned, and pasteurized at a definite temperature and for a time sufficient to insure keeping quality.

The preparation and processing are under laboratory supervision. All employees handling pineapples wear rubber gloves, aprons and caps.

Analysis (submitted by manufacturer).—

	per cent
Moisture	84.1
Ash	0.4
Fat (ether extract)	0.02
Protein (N × 6.25)	0.4
Reducing sugar as invert sugar	12.8
Crude fiber	0.02
Carbohydrates (by difference)	14.3
Titratable acidity as citric acid	0.8

Calories.—0.6 per gram; 17 per ounce.

Vitamins.—Vitamin C assay shows from 9 to 11 Sherman units per ounce.

Claims of Manufacturer.—Practically equivalent to the fresh fruit juice in nutritional values (vitamin C slightly reduced).

THE JOURNAL OF THE AMERICAN MEDICAL ASSOCIATION

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SATURDAY, DECEMBER 8, 1934

BACTERIOPHAGE THERAPY

Bacteriophage preparations have been available to the medical profession for about fifteen years. Some have been offered cautiously under moderate claims; other preparations have been exploited with promulgation of d'Herelle's idea that bacteriophage is a living parasite of bacteria, a sort of vital germicide. A few bacteriophage preparations have been submitted to the Council on Pharmacy and Chemistry, but none have been accepted for inclusion in New and Nonofficial Remedies. Hundreds of papers have been published on the clinical use of bacteriophage products, many of which were made in noncommercial laboratories. What may be said fairly about the composition of these products, the nature of their constituents and the results to be expected from their therapeutic application? The first section of a critical review of the principles and results of the use of bacteriophage infections is published elsewhere in this issue of THE JOURNAL.[1]

The discoveries of Twort and d'Herelle in 1915 and 1917 that bacteria can be dissolved and destroyed by an apparently self-propagating lytic principle were of great importance. Investigations of the nature and actions of this ultramicroscopic, filtrable agent have developed significant information. Uncertainties as to the nature of the material and unwarranted claims for its therapeutic efficacy should not be allowed to cloud the appreciation of its biologic importance.

Two views prevail as to the nature of the lytic principle. d'Herelle has held that it is a living parasite of bacteria, an ultramicroscopic filtrable virus, growing and multiplying in the process of changing or dissolving bacteria. He and his associates have supported this opinion with ingenious experiments and shrewd analogies to filtrable viruses. d'Herelle does not seem to have proved his point, but his hypothesis has not yet been disproved. Other investigators believe that the lytic principle is an inanimate substance of an enzyme-like character, which is reproduced during the course of bacterial autolysis. The difficulty in making crucial experimental tests of these hypotheses comes from the fact that the lytic principle cannot be propagated apart from the living bacteria on which it acts. The weight of opinion, however, now seems to be preponderantly on the side of the argument that the lytic principle is inanimate. Since it has not been proved that the bacteriophage is a living agent and since there is good evidence opposed to the opinion that it is an autonomous agent, claims that it is a "vital germicide" are unwarranted.

The complexity of the "bacteriophage" mixtures is one cause of the confused and contradictory publications. The usual material called bacteriophage is made by allowing lysis to proceed to completion in a young growing broth culture of some bacterium. This is then filtered through a Berkefeld, Mandler or Seitz filter. Sometimes a preservative is added (often to the detriment of the lytic principle). This material then contains (1) the lytic principle or bacteriophage, (2) products of the dissolved bacteria, (3) products of bacterial metabolism, and (4) constituents of the culture medium. In its clinical application, the possible effects of all these constituents must be taken into consideration.

The action of the lytic principle on cultures on plates and in test tubes is undoubtedly far greater than its action on bacteria in the animal body. Blood, pus, bile, urine and other secretions of the body inhibit or annul its ability to dissolve micro-organisms. There is no evidence that lysis or killing of bacteria by bacteriophage occurs in vivo, except possibly in the bladder and walled off spaces, where little exudate is present and where irrigation with large amounts of lytic filtrate can be used. As for its other possible effects on invading bacteria, the evidence is incomplete. By opsonizing bacteria, it may aid in phagocytosis. By causing bacterial variation it may lead to the appearance of less virulent races of the infecting germ, or it may stimulate the appearance of more virulent varieties.

The lytic filtrates have a variety of specificities; some are strictly specific for one type of micro-organism, others affect numerous kinds of related bacteria. Obviously, if any specific therapeutic results are to be obtained, a lytic principle capable of acting on the bacterium causing the infection should be used. To accomplish this purpose, bacteriophages have been prepared against organisms isolated from patients. More often stock preparations of polyvalent bacteriophages or artificial mixtures of several bacteriophages have been applied. In numerous therapeutic trials the capacity of the lytic principle to dissolve the infecting organism in vitro has not been tested, although this is a phase of the clinical use of these materials that should never be neglected.

The products of the dissolved bacteria are excellent antigens. They are good vaccines. They stimulate the production of antibodies and they bring about states of resistance after their injection into the body. The

1. Eaton, M.D., and Bayne-Jones, Stanhope: Bacteriophage Therapy, this issue, p. 1769.

products of bacterial metabolism and constituents of the culture medium, together with the solution of bacterial substance, may have nonspecific protective actions like the effects of nonspecific protein therapy. In fact, the favorable results accredited to bacteriophage therapy may have been due entirely to the specific immunizing action of bacterial proteins in the material used and to nonspecific effects of the broth filtrates.

In this connection it is necessary to mention the so-called antivirus, which is claimed by some manufacturers to be a valuable constituent of these complex mixtures. "Antivirus" is not an antibody in the usual sense. It is a name given by Besredka to some presumed product of bacterial growth, which is supposed to unite with the susceptible receptors of body cells and, by occupying them inertly, prevent a subsequent attachment or attack by the living bacteria. Besredka's views have not been substantiated and there is no convincing evidence that lytic filtrates to which "antivirus" has been added are any more or less effective than the usual filtrates.

Almost every infectious condition from colitis to rhinitis has been treated with bacteriophage. Few controlled clinical studies have been made, and the published reports of the results of all the trials are, on the whole, contradictory. Only in the treatment of local staphylococcic infections and perhaps in cystitis due to colon bacilli and staphylococci has even slightly convincing evidence been presented to show that therapy with lytic filtrates is effective.

A multitude of complexities have been concealed under the simplified terminology of the "bacteriophage metaphor." From these writings there emerge the possibilities that the lytic principle, functioning as an inert substance rather than a living agent, may under certain conditions in the body dissolve bacteria, induce bacterial variation and increase phagocytosis. The chief action of the lytic filtrates appears to be an immunizing action, so that bacteriophage therapy would appear to be essentially a form of vaccine therapy.

RESPIRATORY RESPONSE TO ALTITUDE

The organism is so delicately equilibrated with the environment that any disturbance in its surroundings is followed by changes the magnitude and order of which have long interested physiologists. One naturally thinks of the alterations in temperature to which the body is exposed; the chemical and physical responses to this circumstance are more or less well known. With the development of aviation during the World War and later in a commercial way, more attention has been devoted to the train of events occurring in the organism when high altitudes are reached. The physiologic consequences of the adaptation, so far as they are known, are surprisingly widespread; they include changes in the respiration, in the circulatory mechanism and in the blood itself, all of considerable magnitude. As to the immediate cause of this extensive disturbance, one authority [1] in this field has stated that "most of the bodily changes observed at high altitudes can be directly or indirectly attributed to the relative shortage of oxygen." A complete description of the effects of oxygen want produced by actual ascent to high altitudes or by experimental means in a low pressure chamber provides a striking example of functional integration in the organism.

Perhaps the most immediately appreciated response to a lowered pressure of oxygen is in the respiration.

In a recent study, Hurtado, Kaltreider and McCann [2] have corroborated older observations and added new ones. Three human subjects were exposed in a low pressure chamber to air at a pressure of 419 mm. of mercury, corresponding to an altitude of 16,400 feet. This level of pressure was reached in fifteen minutes and was maintained for two hours. Care was taken to change the air completely at frequent intervals, and accumulation of carbon dioxide was prevented. In common with previous experience, the volume of air breathed per unit of time was increased slightly in two of the subjects with little change in either the rate or the depth of breathing. In airplane flights to high altitudes, the increase in depth of breathing is frequently so gradual and so small in amount that the pilot is unaware of the change; more than one has become unconscious before warned to take oxygen by the subjective sensations. Alveolar air shows a decreased tension of both oxygen and carbon dioxide, a response observed in most persons. When this fails to occur, mountain sickness follows. In the Rochester experiments all three subjects showed a diminution of the vital capacity, a rather constant finding in such studies, and a somewhat greater relative increase in residual air.

Guinea-pigs were killed after two hours in the low pressure chamber and the lungs examined grossly and microscopically. There was pronounced congestion, which was obvious to the naked eye; histologic study revealed dilatation of the capillaries, which in turn resulted in a thickening of the alveolar wall. In the central parts of the lung, many of the alveolar spaces were obliterated. This is of interest in view of the remarkable series of studies on blood flow in the pulmonary capillaries recently reported by Wearn and his associates.[3] By direct observation of a portion of the immobilized lung of anesthetized cats, they saw capillaries disappear and others appear spontaneously in a field without active circulation before. Blood flowed intermittently in the arterioles and capillaries of the lung, and frequently a spontaneous reversal of the direction of flow was seen. The conclusion was reached that normally the average number of active

1. Schneider, E. C.: Yale J. Biol. & Med. **4**: 537 (March) 1932.
2. Hurtado, Alberto; Kaltreider, N. L., and McCann, W. S: Am. J. Physiol. **109**: 626 (Oct.) 1934.
3. Wearn, J. T.; Ernstene, A. C.; Bromer, A. W.; Garr, J. S.; German, W. J., and Zschiesche, L. J.: Am. J. Physiol. **109**: 236 (Aug.) 1934.

capillaries represents only a small portion of the available capillaries per sac. Acute asphyxia did not cause the capillaries or arterioles to open. In the Rochester experiments, on the other hand, the dilatation of the capillaries of the lung was brought about by relative lack of oxygen induced gradually and arose as a compensatory response to the resulting anoxemia. The changes in the lungs likewise account for the observed reduction in vital capacity associated with the decreased pressure of oxygen.

Among other responses by the body to altitude there is an increase in the oxygen-transporting mechanism. There is an increase in the number of red corpuscles and therefore of hemoglobin. One of the significant observations made by Hurtado and his co-workers was a reduction in the saturation of hemoglobin with oxygen at the low pressure; there were in two subjects changes from 99.7 and 95.3 per cent saturation to 68.3 and 74.0 per cent, indicating a pronounced degree of anoxemia. There are important physiologic questions involved in a study of the widespread respiratory response to low pressures of oxygen; in the days to come, when private motor cars and airplanes make ascents to moderate or greater altitudes, the question of the functional disturbances and their rational treatment will become one of considerable practical significance.

TRYPSOGEN-CARNRICK

Knowledge of the glands of internal secretion is at best fragmentary. Nevertheless, as our readers well know, a number of manufacturers have been for years promoting elaborate lists of polyglandular preparations for the treatment of innumerable diseases. One of those most persistently promoted is a product called "trypsogen," prepared by the G. W. Carnrick Company, Newark, N. J. Even today, notwithstanding the vast amount of research that has been published on the treatment of diabetes, this company continues to recommend this product as "a valuable therapeutic agent" in the treatment of this disease. Over the years, the product called "trypsogen" has had a variety of formulas. Once even such inorganic compounds as gold bromide and arsenic bromide were included in it. Its name implies that this product is a precursor of trypsin, which is formed by the action of succus entericus on trypsinogen. In 1913 it was claimed that the preparation consisted of the enzyme of the islands of Langerhans with the tryptic and amylolytic ferments of the pancreas. At that time the gold and arsenic salts were still in the preparation. Later it was claimed that "trypsogen supplies the special internal secretory substance elaborated by the body itself for the control of normal carbohydrate metabolism as well as the special pancreas proteins and amino acid complexes necessary for a regenerative effect on the patients' own defective pancreas."

It has never been demonstrated that trypsogen contains insulin, yet insulin is, of course, "the special internal secretory substance" that controls normal carbohydrate metabolism. Even if this product did contain insulin, however, there is no evidence that it is effective on oral administration. In fact, just the opposite has been proved.

THE JOURNAL has repeatedly called the attention of the medical profession to the fallacious character of these claims, yet the firm never loses heart, presumably because it is able to find enough doctors who are willing to believe its claims to make its advertising worth while. One need not condemn the product, however, merely on its irrational basis. As long ago as 1907, Tyson [1] stated that he had a patient who took "$25 worth of trypsogen tablets without any effect whatever." His experience has been verified repeatedly. Not satisfied, however, with the money it extracts from patients with diabetes, the firm has recently suggested the use of the product "as an adjunct in hypertension." Obviously there is not the slightest scientific evidence to indicate that it has merit in hypertensive disorders.

Years ago there might have been some slight excuse for the use of pancreatic extracts given by mouth in diabetes. Today such use is ignorant, unscientific and absolutely without warrant. The doctor who gives such preparations by mouth to the exclusion of the well established and effective methods of treatment involving proper control of the diet and the use of insulin might well be charged with failing to give his patient the ordinary scientific care expected from any average physician in such a condition. The physician who uses these products allies himself definitely with the promoter in a form of malpractice that might result most seriously for the patient concerned.

Current Comment

AGED PHYSICIANS

In compiling the current issue of the American Medical Directory, some interesting notes were collected relative to physicians of advanced age, many of whom are still in practice. The names of ten doctors were collected who were born between 1828 and 1838, so that the oldest of these men is 106 years of age and the youngest 96. They graduated in medicine from the years 1852 to 1878. Of the four men who are still in practice, the years of practice vary from eighty-one to sixty-nine. These are, of course, remarkable. It is significant that by far the majority of these men of advanced years live in small communities. THE JOURNAL is interested in receiving records of physicians who are more than 95 years of age.

1. Tyson, James: Treatment of Diabetes Mellitus, J. A. M. A. 49:1583 (Nov. 9) 1907.

Association News

MEDICAL BROADCASTS

Columbia Broadcasting System

The American Medical Association broadcasts on a western network of the Columbia Broadcasting System each Thursday afternoon on the Educational Forum from 4:30 to 4:45, central standard time. The next three broadcasts will be as follows:

December 13. Shopping for Health, W. W. Bauer, M.D.
December 20. Social Security, Morris Fishbein, M.D.
December 27. Budgeting for Health, W. W. Bauer, M.D.

National Broadcasting Company

The American Medical Association broadcasts under the title "Your Health" on a Blue network of the National Broadcasting Company each Tuesday afternoon from 4 to 4:15, central standard time. The next two broadcasts will be as follows:

December 11. Care of the Handicapped, Morris Fishbein, M.D.
December 18. Fight Tuberculosis With Modern Weapons, W. W. Bauer, M.D.
December 25. Holiday; no broadcast.

THE ATLANTIC CITY SESSION

Chairmen of Section Committees to Assist in Promotion of Section Exhibits

The fifteen sections of the Scientific Assembly have appointed exhibit committees to assist in the promotion of section exhibits at the Atlantic City session and in the coordination of activities between the Scientific Assembly and the Scientific Exhibit. Chairmen of the section exhibit committees are as follows:

PRACTICE OF MEDICINE:
Irving S. Wright, New York.

SURGERY, GENERAL AND ABDOMINAL:
Alton Ochsner, New Orleans.

OBSTETRICS, GYNECOLOGY AND ABDOMINAL SURGERY:
H. C. Hesseltine, Chicago.

OPHTHALMOLOGY:
Georgiana Dvorak-Theobald, Oak Park, Ill.

LARYNGOLOGY, OTOLOGY AND RHINOLOGY:
William V. Mullin, Cleveland.

PEDIATRICS:
F. Thomas Mitchell, Memphis, Tenn.

PHARMACOLOGY AND THERAPEUTICS:
C. D. Leake, San Francisco.

PATHOLOGY AND PHYSIOLOGY:
Frank W. Hartman, Detroit.

NERVOUS AND MENTAL DISEASES:
Groves B. Smith, Godfrey, Ill.

DERMATOLOGY AND SYPHILOLOGY:
Fred D. Weidman, Philadelphia.

PREVENTIVE AND INDUSTRIAL MEDICINE AND PUBLIC HEALTH:
Paul A. Davis, Akron, Ohio.

UROLOGY:
Russell S. Ferguson, New York.

ORTHOPEDIC SURGERY:
Paul N. Jepson, Philadelphia.

GASTRO-ENTEROLOGY AND PROCTOLOGY:
A. H. Aaron, Buffalo.

RADIOLOGY:
S. W. Donaldson, Ann Arbor, Mich.

Application blanks for space in the Scientific Exhibit may be obtained from any of the foregoing chairmen, or from the Director, Scientific Exhibit, 535 North Dearborn Street, Chicago.

Medical News

(PHYSICIANS WILL CONFER A FAVOR BY SENDING FOR THIS DEPARTMENT ITEMS OF NEWS OF MORE OR LESS GENERAL INTEREST: SUCH AS RELATE TO SOCIETY ACTIVITIES, NEW HOSPITALS, EDUCATION, PUBLIC HEALTH, ETC.)

ARIZONA

Personal.—Dr. Hugh A. Rasmussen, Westby, Wis., has been appointed medical officer for the Pima Indian Agency near Phoenix.——Dr. Louis C. B. Baldwin, Phoenix, formerly assistant professor of medicine, University of Rochester School of Medicine, Rochester, N. Y., has been appointed physician-in-chief of the Desert Sanatorium and Institute of Research, Tucson.

CALIFORNIA

Personal.—Dr. Harper Peddicord, Redwood City, has been appointed health officer of San Mateo County to succeed Dr. Harold E. Morrison. Dr. Frank H. Folkins is health officer of Redlands, succeeding Dr. Harold G. Gentry and Dr. Perryman F. Page Jr., health officer of Taft, succeeding Dr. Oran Newton.

Professor Anrep to Give Lane Lectures.—Dr. Gleb V. Anrep, professor of physiology, Egyptian University, Cairo, Egypt, will deliver the 1935 series of Lane Lectures at Stanford University School of Medicine, April 22-26. The five lectures will cover various phases of "Regulation of the Cardiovascular System." The Lane lectures were established in 1896 by Dr. Levi Cooper Lane, San Francisco, the founder of Cooper Medical College, which in 1908 became the school of medicine of Leland Stanford Junior University. Every two years some physician or scientist who has made a definite contribution in the field of medicine is invited to give a free course of lectures for medical students and the medical profession at large.

CONNECTICUT

Fellowships for Study of Adolescence.—Yale University School of Medicine announces the establishment of five fellowships by the Rockefeller Foundation for the study of adolescence, which will be approached through studies of anatomy, physical anthropology and anthropometry; physiology, biochemistry and nutrition; psychology and psychiatry; medicine, particularly pediatrics and immunology, and education and social adjustments. It is hoped to discover the methods by which data can be obtained on the growth and development of individuals during the second decade of life. The medical school has also effected a working relationship with the university department of physics. Appointments are to be for two years and they are to expire in alternate years so that one of the two men will always have had one year's experience on the project.

DELAWARE

Health at Wilmington.—Telegraphic reports to the U. S. Department of Commerce from eighty-six cities with a total population of 37 million, for the week ended November 24, indicate that the highest mortality rate (18.6) appears for Wilmington and the rate for the group of cities as a whole, 11.3. The mortality rate for Wilmington for the corresponding period last year was 10.8 and for the group of cities, 11.5. The annual rate for eighty-six cities for the forty-seven weeks of 1934 was 11.3 as compared with a rate of 10.9 for the corresponding period of the previous year. Caution should be used in the interpretation of these figures, as they fluctuate widely. The fact that some cities are hospital centers for large areas outside the city limits or that they have a large Negro population may tend to increase the death rate.

DISTRICT OF COLUMBIA

Medical Bureau for the Needy.—Creation of a medical admitting bureau in Washington for persons seeking free medical care has been endorsed by the Medical Society of the District of Columbia. It is proposed that the bureau be operated in cooperation with the Community Chest and handle all applications for free treatment at medical clinics or for free hospital care. The plan endorsed by the society calls for a special supervising committee, consisting of members from the executive committee of the Community Chest, the hospital superintendents' association and the medical and dental societies.

ILLINOIS

Conference of Health Officers.—The annual conference of Illinois health officers and public health nurses will be held in the Centennial Building, Springfield, December 11-12. The following program will be presented:

Dr. David J. Davis, Chicago, The Medical College and Preventive Medicine.
Dr. Wilson G. Smillie, Boston, Practical Epidemiology.
Dr. David O. N. Lindberg, Decatur, Case Finding in a Tuberculosis Program.
H. J. Shaughnessy, Ph.D., Springfield, The Laboratory and Epidemiology.
Pearl McIver, R.N., Washington, D. C., Community Coordination for a Public Health Nursing Program.
Eva F. MacDougall, R. N., Indianapolis, Qualities for Success in a Public Health Nurse.
Dr. Earl E. Kleinschmidt, Ann Arbor, Mich., A Philosophy of Health Education.
Dr. Warren F. Draper, Washington, D. C., Administrative Practice in Public Health.
Dr. Herman N. Bundesen, Chicago, Popularizing Preventive Medicine.
Dr. Sidney O. Levinson, Chicago, Convalescent Serum in Infantile Paralysis.
Dr. Archibald L. Hoyne, Chicago, Convalescent Serum in Scarlet Fever.
Dr. Joseph A. Baudouin, Montreal, Vaccination in Control of Tuberculosis.
Dr. Clifford G. Grulee, Chicago, Breast Feeding as a Factor in Preventive Medicine.
Dr. Winston H. Tucker, Springfield, Epidemic Encephalitis.
Dr. Albert S. Gray, Hartford, Conn., Newer Phases of Occupational Hazards.
Dr. Lloyd L. Arnold, Chicago, Practical Control Methods in Syphilis.

Chicago

Dr. Flexner to Give Pasteur Lecture.—Dr. Simon Flexner, director of laboratories, Rockefeller Institute of Medical Research, New York, will deliver the thirteenth Pasteur Lecture of the Institute of Medicine of Chicago, April 26. His subject will be "Virus Diseases of the Central Nervous System: Their Extent and Mode of Infection."

General Practitioner's Night.—"Acute Coronary Thrombosis" will be the theme of the meeting of the Chicago Medical Society, designated "General Practitioner's Night," December 12. Speakers will be Drs. Laurence E. Hines, James G. Carr, Chauncey C. Maher, Don C. Sutton and Sidney Strauss. The society sponsored a lay educational program, December 5. Dr. William A. O'Brien, associate professor of preventive medicine and public health and pathology, University of Minnesota School of Medicine, Minneapolis, presented "The Story of Cancer" and Dr. Morris Fishbein, editor of THE JOURNAL, "Cancer Charlatans."

Society News.—Speakers before the Chicago Society of Internal Medicine, November 26, were Drs. Rudolph Schindler on "Gastroscopy—Present Status and Value in Diagnosis of Gastric Disease"; James G. Carr, "Clinical Experiences with a Derivative of Squill," and Joseph L. Miller, "Recent Advances in Our Knowledge of the Thyroid Gland."——At a meeting of the Chicago Laryngological and Otological Society, December 3, Dr. John Gordon Wilson presented "A New Approach to the Study of Otosclerosis"; Austin A. Hayden, "Otologists and Leagues for the Hard of Hearing," and Miss Gertrude Torrey, "Application of Lip Reading to Cases of Progressive Deafness."

Conference on Birth Control.—A conference on the scientific, practical and ethical aspects of the Ogino-Knaus method of birth control will be held in the Cameo Room of the Morrison Hotel, December 10, at 8 o'clock, under the auspices of the Catholic Physicians' Guild of Chicago. The following program will be presented:

Dr. Andrew C. Ivy, professor of physiology and pharmacology, Northwestern University Medical School, The Physiology of Ovulation.
Dr. Arthur G. Miller, director of the Miller Clinic, Hobart, Ind., an illustrated demonstration of the validity of the Ogino-Knaus method from 154 clinical cases.
Rev. John A. O'Brien, professor in the Newman Foundation and chaplain of the Catholic students, University of Illinois, Lawful Birth Control in Harmony with Science and Ethics.

Participating in the formal discussion will be

Dr. Anton J. Carlson, chairman, department of physiology, University of Chicago.
Dr. Frederick H. Falls, professor of gynecology and obstetrics, University of Illinois College of Medicine.
Dr. Mark T. Goldstine, chief of medical and surgical staffs, Wesley Memorial Hospital.
Dr. N. Sproat Heaney, clinical professor of gynecology and obstetrics, Rush Medical College.
Dr. Henry Schmitz, professor and head of the department of gynecology of Loyola University.
Dr. Irving F. Stein, president, Chicago Gynecological Society.

An invitation is extended to members of the Chicago Medical Society and to out of town physicians and scientists interested in the problem of birth control.

IOWA

Executive Secretary Resigns.—Mrs. Dorothy C. McCarthy has resigned as executive secretary of the Iowa State Medical Society, effective November 1. Miss Dorothy M. Nelson has been named acting executive secretary. The position was created at the annual session of the state society in 1933, and Mrs. McCarthy was the first incumbent.

Society News.—Dr. Vernon C. David, Chicago, discussed pathology and treatment of some lesions of the colon and rectum before the Black Hawk County Medical Society in Waterloo, October 16.——Dr. Victor E. Levine, Omaha, discussed the classification and treatment of the anemias before the Cerro Gordo County Medical Society in Mason City, October 9.——Dr. Frederick J. Swift, Des Moines, of the state health department, addressed the Clinton County Medical Society, November 1, on public health activities.——The Dallas-Guthrie Medical Society was addressed in Panora, October 18, among others, by Dr. Percival B. Glew, Dallas Center, on "Salivary Calculi."——Dr. Nathaniel G. Alcock spoke before the Johnson County Medical Society in Iowa City, October 3, on transurethral prostatic resection.——A symposium on sanitation was presented before the Marion County Medical Society in Pella, October 12, by Dr. Carl Aschenbrenner, C. J. Scott, D.V.M., and T. G. Fultz, D.V.M.——Dr. Clinton E. Harris, Woodmen, Colo., addressed the Poweshiek County Medical Society in Grinnell, October 10, on tumors of the chest.

MASSACHUSETTS

Collection of Photographs of Ophthalmologists.—A collection of photographs begun by the late Dr. Lucien Howe forms the nucleus of a gallery now being assembled at the Howe Laboratory of Ophthalmology, Boston, under the direction of Mrs. Howe. A large part of the collection are photographs of the chairmen of the Section on Ophthalmology of the American Medical Association. This group of fifty-three photographs, most of which are autographed, were collected by Dr. George S. Derby and, following his death, in compliance with his wish, were given to the laboratory. The founders of the American Ophthalmological Society, Drs. Freeman J. Bumstead, Hasket Derby and Henry D. Noyes, constitute a second group. Included also are photographs of Drs. Edward Reynolds and John Jeffries, who established the Massachusetts Eye and Ear Infirmary in 1824; Dr. Elisha North, founder in 1817 of the New London Eye Infirmary, the first institution of its kind in the United States; Drs. Edward Delafield and John K. Rodgers, founders of the New York Eye Infirmary in 1820; Dr. Philip Syng Physick, who established the Pennsylvania Infirmary for Diseases of the Eye and Ear in 1822; Dr. George McClellan, founder of the Institution for Diseases of the Eye and Ear in Philadelphia, 1821, and Dr. Edward L. Holmes, one of the founders of the Illinois Charitable Eye and Ear Infirmary in 1858. Eleven countries are represented in the collection of 125 photographs, but there is as yet no grouping on that basis. Dr. Howe died in Belmont in 1928. He was chairman of the Section on Ophthalmology of the American Medical Association, 1895-1896; emeritus professor of ophthalmology, University of Buffalo School of Medicine, and past president of the American Ophthalmological Society. He was responsible for the so-called Howe Law in 1890, which was the first law for the prevention of ophthalmia neonatorum by providing for the use of prophylactic drops in infant's eyes. In 1926 he gave $250,000 to Harvard University to establish the Howe Laboratory of Ophthalmology, of which he was the director. He was awarded the Leslie Dana Gold Medal in 1927.

MINNESOTA

Cosmetician's Claims Unwarranted.—The state board of medical examiners has warned Mrs. Ella Graham, Maple Lake, that she must refrain from representing herself as a skin specialist. Mrs. Graham has been traveling about the state taking orders for cosmetics, and an investigation was made following her visit to Anoka, where she is said to have represented herself as a skin specialist.

Society News.—Speakers before the Minnesota Academy of Medicine, November 14, were Drs. Frank E. Burch, St. Paul, and Martin Nordland, Minneapolis, on "Surgical Treatment of Retinal Detachment" and "Hyperthyroidism in Children," respectively.——Speakers before the Clay-Becker County Medical Society at Lake Park, November 2, were Drs. Jay Arthur Myers, "Diagnosis, Treatment and Prevention of Tuberculosis"; Harold S. Diehl, "The Common Cold," and Ralph V. Ellis, "Diagnosis and Treatment of Hay Fever."——At a meeting of the Hennepin County Medical Society, November 5, Drs. Reu-

ben A. Johnson and Hobart A. Reimann discussed "Micrococcus Tetragenus Infection" and "Recent Advances in the Specific Therapy of Pneumonia," respectively. Dr. Thomas M. Rivers, New York, addressed the society, November 21, on encephalitis.

MISSOURI

Fifty Years in Practice.—Twenty-six members of the St. Louis Medical Society were honored at a meeting, November 27, in commemoration of the completion of fifty years or more in the practice of medicine. Rabbi Julius Gordon was the speaker; the title of his talk was "A Minister Looks at Medicine." The guests of honor were:

Carl Barck
Louis C. Boisliniere
Henry S. Brookes
James A. Dickson
Meyer J. Epstein
William A. Fries
Francis R. Fry
Joseph Grindon
Moses E. Haase
Willis Hall
Eugene F. Hauck, Clayton
Louis Hauck
Moses W. Hoge
George A. Humpert
Bransford Lewis
Heine Marks
Fred W. Patton
Amand N. Ravold
Francis L. Reder
Henry Schwarz
George N. Seidlitz
Max C. Starkloff
Paul F. Vasterling
John W. Vaughan
Benjamin A. Wilkes, Los Angeles
Henry L. Wolfner

NEW YORK

Society News.—Dr. William A. Sawyer, Rochester, was elected president of the Tuberculosis and Health Association of Rochester and Monroe County at a meeting, October 24. Philip P. Jacobs, Ph.D., of the staff of the National Tuberculosis Association, New York, conducted a tuberculosis institute the same day under the auspices of the county, state and national organizations, with the cooperation of Rochester health and social agencies.

New York City

The Sir Robert Jones Lecture.—Dr. Philip D. Wilson, surgical director of the Hospital for Ruptured and Crippled, delivered the fifth Sir Robert Jones Lecture at the Hospital for Joint Diseases, December 6, entitled "What Can Orthopedic Surgery Do for the Arthritic Cripple?"

Study of Appendicitis.—At a combined meeting of the section on medicine and surgery of the New York Academy of Medicine, December 7, Dr. Shepard Krech made a report on a two years study of acute appendicitis, conducted at the request of the academy in fourteen hospitals. The operative mortality of acute appendicitis was found to be 7 per cent in 1921 and the same in 1931. At a recent meeting of the academy, it was voted that the committee on public health relations make a further study along the lines of the recent study of maternal mortality.

Professor Urey Receives Nobel Prize in Chemistry.—Harold C. Urey, Ph.D., associate professor of chemistry, Columbia University, has been honored with the Nobel prize in chemistry for 1934 for his discovery of double weight hydrogen. Dr. Urey, a native of Indiana, took his baccalaureate degree in zoology at the University of Montana and his advanced degree in chemistry at the University of California in 1923. He is the editor of the *Journal of Chemical Physics* and co-author of "Atoms, Molecules and Quanta." Dr. Urey last April received the Willard Gibbs Medal of the Chicago section of the American Chemical Society.

Applicants for Free Medical Services.—More than 2,000 names of persons seeking free or partly free health and welfare services were cleared each day through the Social Service Exchange during the fiscal year from Oct. 1, 1933, to Oct. 1, 1934, according to the annual report. The total number of names cleared during the year was 634,984, as compared with 712,428 for the corresponding period of 1932-1933. Almost half the number, 328,967, were known to one or more social agencies in the city. The exchange is a cooperative activity carried on under the auspices of the Welfare Council for more than 500 health and welfare organizations in order to make their services quickly available.

Hospitals Protest Taxation.—The nonmunicipal hospitals of New York have suffered severe hardship through new state and federal statutes that impose indirect taxes, the Hospital Information and Service Bureau asserted in its annual report to the United Hospital Fund. All voluntary hospitals were compelled to pay the sales tax, which was put into effect in New York May 1, 1933. They must also pay processing taxes on cotton, wheat, corn, pork products and certain paper products, but they are entitled to a refund on the percentage of goods that is used exclusively for the care of the poor. Other problems that beset the hospitals in their efforts to lower maintenance costs are lack of relief funds to help defray cost of free care, underpayment by the city for public charges, and the proposed eight hour day for nurses. Nine convalescent homes were forced to close during the past year, depriving the city of 305 beds, the bureau reported. Dr. Charles Gordon Heyd is chairman of the hospital information bureau and E. H. Lewinski-Corwin, Ph.D., is director. The United Hospital Fund opened its annual campaign for funds, November 26. It seeks to raise $500,000.

OREGON

Society News.—The Polk-Marion-Yamhill Counties and Central Willamette medical societies held a joint meeting at Newport, September 22, at which the following scientific program was presented: Drs. James C. Masson, Rochester, Minn., on "Use of Living Sutures in the More Difficult Abdominal Hernias" and "Malignancy of the Large Bowel"; John M. Blackford, Seattle, "Hypertension"; Hale A. Haven, Seattle, "Surgical Relief of Pain," and Albert W. Holman, Portland, "Nephritis."

Guest Home for Psychoneurotic Patients.—Announcement is made of the opening in Portland of the Northwest Retreat, a guest home for convalescent or psychoneurotic persons, under the direction of Dr. James L. McCartney, until recently psychiatrist on the staff of the New York State Department of Corrections. Preference will be given to persons in a cooperative state in which a favorable result may be expected. The Retreat will be conducted as a private residence. Persons interested in the understanding of psychiatry and mental hygiene are invited to attend an open house every Friday afternoon followed by a seminar period.

PENNSYLVANIA

Society News.—Drs. Charles D. Ambrose, Ligonier, and Robert C. Johnston, New Kensington, addressed the Beaver County Medical Society, October 11, at Rochester, on "Endocrine Infantilism" and "Acute Intestinal Obstruction—Diagnosis and Treatment," respectively.——Drs. Ethel F. Buchman and Lucy Etta B. Vaughn of the staff of the Allentown State Hospital addressed the Lehigh County Medical Society, October 9, on "Manic Depressive Psychosis" and "Involutional Melancholia," respectively.——Dr. Sidney A. Chalfant, Pittsburgh, addressed the Erie County Medical Society, Erie, November 6, on diagnosis and treatment of uterine cancer.

Philadelphia

Mütter Lecture.—Dr. Charles H. Frazier, John Rhea Barton professor of surgery, University of Pennsylvania School of Medicine, delivered the Mütter Lecture of the College of Physicians of Philadelphia, December 5; his subject was "A Review, Clinical and Pathological, of Parapituitary Lesions."

Conference on Cancer Research.—The woman's auxiliary of the Lankenau Hospital Research Institute for the Promotion of Cancer Research sponsored its second annual conference, November 20, at the New Century Club. Dr. James B. Murphy of the Rockefeller Institute for Medical Research, New York, made an address on "Ideas and Ideals in Cancer Research"; Dr. Stanley P. Reimann, director of the Lankenau Hospital clinical laboratory, on "Current Events in Cancer Research," and Mrs. Lewis R. Dick, vice president of the auxiliary, "The 'Active Principle' in Cancer Research." In the afternoon a visit to the institute was scheduled, with an exhibition of apparatus, materials and methods and a motion picture showing behavior of living cells as special features.

Society News.—Speakers at a meeting of the Northern Medical Association of Philadelphia, November 19, were Drs. Abram H. Persky, on "The Tonsils and Their Rôle in Focal Infection"; Herman W. Ostrum, "Precordial Pain—The Etiology as Revealed by X-Ray Study," and Michael G. Wohl, "Renal and Extrarenal Coma."——Dr. Meredith F. Campbell, New York, addressed the Philadelphia Urological Society, November 26, on "Bladder Outlet Obstruction in Infants and Children."——At a meeting of the Eastern Pennsylvania chapter of the Society of American Bacteriologists, November 27, speakers included Drs. John A. Kolmer, on "A New Antigen for the Wassermann Test," and Ralph M. Tyson and Donald F. Lyle, "Infantile Diarrhea Due to B. Pyocyaneus."

RHODE ISLAND

Hospital News.—Dr. George Levene, Boston, gave an address at the State Hospital for Mental Diseases, Howard, on "Roentgenological Evidence of Cranial Dysplasias of Pituitary Origin." Dr. Joannes G. Dusser de Barenne, Sterling professor of physiology in the Yale University School of Medicine, New Haven, delivered an address, November 20, on "Recent Studies on Laminar Corticology."

in the problem of birth control.

the Hennepin County Medical Society, November 5, Drs. [illegible]

TENNESSEE

University News.—Col. Fielding H. Garrison, librarian of the William H. Welch Memorial Library at Johns Hopkins University, addressed the faculty and students of Vanderbilt University School of Medicine, October 18, on "Life as an Occupational Disease."

Personal. — Dr. Cecil B. Tucker, Knoxville, has been appointed director of a recently organized health district made up of Anderson and Campbell counties. Dr. Fray O. Pearson, Alexandria, succeeded Dr. Tucker on the staff of the Knoxville health department. Another district has been organized to include Carter and Unicoi counties, with Dr. Russell B. Howard, Elizabethton, in charge and Dr. Bernard W. Patton, Memphis, as assistant in charge of Unicoi County, with headquarters in Erwin.

VIRGINIA

Professor Appointed.—Dr. Frederick B. Mandeville, director of the roentgenologic laboratory at Peralta Hospital, Oakland, Calif., for the past three years, has been appointed professor of roentgenology at the Medical College of Virginia, Richmond. He will also be full time roentgenologist to the hospitals operated by the college. Dr. Mandeville succeeds Dr. Daniel D. Talley Jr., who had served since the death of Dr. Alfred L. Gray, giving as much time as his private practice permitted.

University News.—Dr. Paul B. Barringer, University, is sponsoring a plan to place a marker on the home where Dr. Walter Reed lived while he was a student at the University of Virginia.——The fourteenth postgraduate clinic at the University of Virginia Hospital was held November 16 in cooperation with the department of clinical education of the Medical Society of Virginia. Among the features were discussions of agranulocytosis by Dr. Henry B. Mulholland, laboratory diagnosis of anemia by Dr. William E. Bray and appendicitis in children by Dr. William H. Goodwin. Dr. Maximilian Ehrenstein, formerly lecturer in pharmacologic chemistry at the University of Berlin, has accepted a fellowship in physiology at the university for the current session to engage in investigations on the suprarenal glands.

GENERAL

Automobile Accidents Increase 16 Per Cent.—Approximately 28,400 persons were killed and 740,000 injured in automobile accidents during the first ten months of this year, according to figures compiled by the Travelers Insurance Company, Hartford, Conn. The number of deaths is an increase of 16 per cent over the number for the same period of last year, a fact which indicates that the full number for the year will reach an all-time record. The previous record was in 1931, when more than 33,000 were killed. Pedestrians were the victims in 48 per cent of the cases, as against 45 per cent for the whole of last year. August was the only month to show a decrease compared to the corresponding month of last year. Among states that reported through September, decreases occurred in Connecticut, Maine, New Hampshire and New Jersey. Available records show that there has been a gain of 24 per cent in the number of drivers who were declared intoxicated and a gain of more than 55 per cent among pedestrians declared intoxicated.

Society News.—Dr. Hermon Marshall Taylor, Jacksonville, Fla., was elected president of the Southern Medical Association at the annual meeting in San Antonio, Texas, November 13-16. Drs. Samuel Orr Black, Spartanburg, S. C., and John Manning Venable, San Antonio, were elected vice presidents. The next annual session will be held in St. Louis.——At the annual meeting of the United States Live Stock Sanitary Association at the Hotel La Salle, Chicago, Dr. Paul B. Brooks, deputy health commissioner of New York, Albany, discussed milk-borne infections and Dr. Henry D. Chadwick, state health commissioner of Massachusetts, incidence of tuberculosis in school children.——Dr. Hugh S. Cumming, surgeon general, U. S. Public Health Service, was unanimously reelected director general of the Pan-American Sanitary Office, and Dr. Justo F. Gonzalez, Uruguay, is secretary. Dr. Jorge Bejarano, Colombia, was elected organizing president for the tenth Pan-American Sanitary Conference, which will be held in Bogota, Colombia, in 1938.——The 1935 conference of the American Federation of Organizations for the Hard of Hearing will be held in Cincinnati, June 2-6.

Fellowships in Physiology. — Four fellowships of $250 each, to be awarded for the fifteenth International Physiological Congress in Leningrad-Moscow in 1935, are announced by the Federation of American Societies for Experimental Biology. One fellowship will be awarded in each of the branches of biologic science represented by the four constituent societies of the federation; namely, the American Physiological Society, American Society of Biological Chemists, American Society for Pharmacology and Experimental Therapeutics and American Society for Experimental Pathology. Each candidate, who does not have to be a member of the federation, must be recommended by some member of the society representing the field of study or some other person familiar with the candidate's work. Candidates must be under 35 years of age and must not have attained professorial rank or its equivalent, and each must present with his application a draft of a meritorious paper to be presented at the congress. Applications must be made before Jan. 15, 1935, to the secretary of the society which includes the field of study. Secretaries are: for physiology, Dr. Frank C. Mann, Mayo Clinic, Rochester, Minn.; for biologic chemistry, Henry A. Mattill, Ph.D., State University of Iowa, Iowa City; for pharmacology and experimental therapeutics, Dr. Eugene M. K. Geiling, Johns Hopkins University School of Medicine, Baltimore, and for experimental pathology, Dr. Shields Warren, Palmer Memorial Hospital, Boston.

Look Out for Thomas Henry Robinson Jr.—The Divison of Investigation of the U. S. Department of Justice reports that Thomas Henry Robinson Jr. is being sought in connection with the kidnaping at Louisville, Ky., October 10, of Mrs. Alice Speed Stoll. This man has been receiving treatment for syphilis and is said to have "difficulty of a rheumatic nature with his feet." He has also been receiving treatment for "eye trouble." Robinson is 22 years old, is 6 feet tall, weighs about 149 pounds and is of slender build, with black hair, gray eyes and fair complexion. The photograph here reproduced was taken in June 1929. The Division of Investigation, U. S. Department of Justice, Washington, D. C., requests that any physician who comes into possession of any information concerning the whereabouts of Thomas Henry Robinson Jr. notify it or the special agent in charge of the office of the division in the nearest large city in the state.

Change in Status of Licensure. — The state board of medical education and licensure of Pennsylvania at a meeting, October 18, took the following action:

License of Dr. Eugene Julius Hamborszky, Farrell, indefinitely suspended because of conviction on charges of narcotic violation and addiction.

License of Dr. A. F. P. Huston, Pittsburgh, which was suspended in June, restored with full rights to practice.

The Idaho Department of Law Enforcement reports the following:

Dr. Floyd A. Benjamin, Emmett, license suspended, August 14, for violation of the Harrison Narcotic Act.

The Maryland Board of Medical Examiners reports the following:

Dr. Benjamin H. Smart, North Beach, Md., license revoked, recently, because his license to practice in the District of Columbia had been revoked for a crime involving moral turpitude.

The California State Board of Medical Examiners announces the following:

Dr. Thomas Oliver Greig, Berkeley, license revoked, October 17, for violations of the terms of his probation imposed, Oct. 22, 1930, which prohibits his using or possessing alcohol.

Dr. Robert Vivian Baker, Avalon, license revoked, October 16, based on narcotic charges.

Dr. John R. U. Campbell, Dunsmuir, placed on probation for five years, October 16, during which time he shall not have nor apply for a narcotic permit or have narcotics in his possession.

Dr. Rudolph F. Rohlfing, Los Angeles, license restored, October 16; placed on probation for five years.

Dr. Roy F. Ruth, Los Angeles, license restored, October 17, placed on probation for five years without narcotic permit or privileges.

Dr. Arthur N. Nelson, Los Angeles, placed on five years' probation without narcotic permit or possession.

Dr. John Marshall Robinson, Los Angeles, placed on probation for five years, October 17, without narcotic privileges.

The Illinois State Department of Registration and Examination reports the following:

Dr. Jessie Abigail Shipley Traxler, Chicago, license revoked, November 3, for violation of the Harrison Narcotic Act; she is now in the federal industrial institution for women at Alderson, W. Va.

Geographic Distribution of Mortality.—A study of standardized death rates in individual states, recently published in the *Statistical Bulletin* of the Metropolitan Life Insurance Company, shows that North and South Dakota have the lowest mortality of any states, 7.9 and 7.6 per thousand, respectively. Next come a group of states with rates between 8 and 9, six in the Middle West: Nebraska, Kansas, Oklahoma, Minnesota, Iowa and Wisconsin, and three in the Northwest: Washington, Oregon and Idaho. The next range of death rates, from 9 to 10, is found in California, Wyoming, Montana, Utah in the West; Michigan, Indiana, Ohio, Kentucky, Missouri, Arkansas and Mississippi in the central part; Florida in the South, and Vermont, New Hampshire and Connecticut in the East. States with a rate from 10 to 11 include Maine, Massachusetts, Rhode Island, New York, Pennsylvania, New Jersey, Delaware, Maryland, Virginia, West Virginia, North and South Carolina, Georgia, Tennessee, Alabama, Louisiana and Illinois. The highest mortalities are found in Colorado and Nevada, with rates between 11 and 12, and in Arizona and New Mexico, more than 12. The high rates in these four states are probably due to the large proportion of Mexicans, among whom death rates are higher than among Americans, and to the influx of persons suffering from tuberculosis, the bulletin points out. In the Dakotas a favorable climate and the relatively safe and comfortable life on farms and in small towns combine to keep the inhabitants well, it was said. Reliable data were not available for Texas for the period considered in this study, 1929-1931.

Government Services

Changes in Public Health Service

Passed Asst. Surg. Frederick P. Burow, relieved at Ellis Island, N. Y., and assigned at Hamburg, Germany, in connection with the examination of aliens.

Passed Asst. Surg. Ivan W. Steele, relieved at Hamburg, and assigned at the American Consulate, Berlin, Germany.

Dr. Arthur B. Price, appointed and commissioned as assistant surgeon.

Asst. Surg. Henry L. Wollenweber, relieved at San Francisco and assigned at the National Institute of Health, Washington, D. C.

Warning About Cinchophen and Amidopyrine

The Food and Drug Administration has issued a warning to the public to be wary of cinchophen and amidopyrine, which are frequently used in remedies advertised for rheumatism and neuralgia. The statement pointed out that serious poisoning from these drugs develops insidiously, cinchophen causing degeneration of the liver cells and amidopyrine destruction of white blood cells. These drugs are not included in the list of those which the law requires manufacturers to declare on their labels, because cinchophen was unknown when the law was passed and the dangerous effects of amidopyrine had not been recognized. The administration urged buyers to look for declarations of the presence of the two drugs on labels or to write to Washington for information in case of doubt.

School for Children with Trachoma

A "trachoma school" has been opened on the Fort Apache Reservation in Arizona, in which about 300 children with trachoma will be placed under treatment. The school, which occupies a former boarding school, will be under the immediate direction of Dr. James C. Hancock, under the general supervision of Dr. Polk Richards, medical director of trachoma activities. Other such schools will be established later in areas where trachoma is a menace, according to an announcement by John Collier, commissioner of Indian Affairs.

CORRECTION

Carbon Tetrachloride as an Industrial Hazard.—In his article as printed in THE JOURNAL, September 29, page 962, Dr. Paul A. Davis wishes to make the following corrections: Under experimental data, 113,347.5 should read 113,311.47. In experiment 1, 126 should read 116. In experiment 2, 63 should read 58, 0.0076 should read 0.0079, and 76 should read 79. In experiment 4, 252 should read 232. In experiment 5, 0.1191 should read 0.1264, 1,008 should read 928, and 1,191 should read 1,264. In experiment 6, gram should read grain, 0.2382 should read 0.2370, and 1,890 should read 1,740. In experiment 8, 11¾ pounds should read 21¾ pounds, 0.234 should read 0.00435, and 0.37 should read 0.0069.

Foreign Letters

LONDON

(From Our Regular Correspondent)

Nov. 10, 1934.

The Undiminishing Maternity Mortality

While the general death rate and the infantile death rate have been greatly reduced in recent years, the maternal death rate shows no diminution. The Ministry of Health has issued a circular to the local authorities saying that, in spite of what has been done in the past three years to improve and develop maternity services, the maternity mortality has not yet begun to fall. The minister recognizes that it could not be expected that the full effect of the measures which have been taken would so soon be reflected in the mortality statistics. At the same time he finds that there are still many areas in which the maternity service is neither complete nor satisfactory and that there are few, if any, in which there is not scope for further improvement. In all areas there is probably need for more intensive effort to educate women as to the importance of antepartum supervision and to persuade them to use the facilities provided for the purpose. The minister has on more than one occasion expressed the view that there is a clear case for development of the maternity service on urgent grounds of public health, and he considers that it would be true economy for each authority to do what is needed to provide a service that is both effective and comprehensive.

At a dinner of the British College of Obstetricians and Gynecologists, Mr. Baldwin, formerly prime minister, gave an assurance that the government wished the college well and had followed its work with interest. The college (which has only recently been established) hoped, he said, to do for obstetrics and gynecology what the College of Physicians was doing for medicine and the College of Surgeons for surgery. There was no doubt that, with all the work which had been done in regard to sanitation, housing and old age pensions, the whole question of child welfare and maternal mortality had come into the national picture in a way that it had never done before. The country did not realize that, while during the present century the general death rate had been reduced by about one third, tuberculosis had been reduced by an equal amount, and infant mortality by nearly one half, the maternal death rate was slightly increasing. It had been shown that half of the maternal deaths in Great Britain were preventable. That was a terrible indictment. It was extraordinary that the country had for so long taken these deaths, like accidents on the road, as a matter of course. They were in fact a reflection on the intelligence of the people and on humanity. There was also the suffering in later life from neglected childbirth. He had been told that, if the women received proper attention before and during childbirth and for a short time afterward, the number occupying women's wards in hospitals would be reduced by one half. Was there some factor to account for the high mortality which had hitherto escaped their vigilance? Could they not achieve closer working with the Medical Research Council? In reply, the chairman, Dr. J. S. Fairbairn, spoke of the work which the college had begun in conjunction with the National Birth Day Trust Fund in arranging a clinical investigation to alleviate the pains of childbirth among women attended only by midwives.

A meeting of more than 1,000 women was held at the Friends House, London, arranged by the Maternal Mortality Committee, whose report criticized the way in which local authorities were neglecting to make full use of the Maternity and Child Welfare Act and stated that the act was inadequate to deal with the present situation. Lady Denman, who presided,

read a telegram from Lord Horder suggesting that more attention should be paid to the question of the fitness of women to bear children and less to the competence of physicians and nurses. Mrs. Barton, of the Women's Cooperative Guild, moved a resolution stating that the conference was deeply impressed by the reports of malnutrition among married women, especially in areas of prolonged unemployment. Mrs. Frankenburg, a midwife, seconded the resolution but called attention to the fact that malnutrition was not the only cause of high maternal mortality, for statistics showed that the death rate was higher in the west end than in the east end of London. This important statement aroused a display of indignation from the socialistic audience bent on emphasizing malnutrition. Mrs. Frankenburg also caused indignation by saying that women needed education in what was the correct diet. There was too much preference for the tasty can of salmon compared with eggs and milk. Mrs. Sutherland, chief woman officer of the Labor Party, objected to these remarks and said that the can and the can opener were the only labor-saving devices within the reach of the working class woman. Lady Barrett, gynecologist of the London School of Medicine for Women, suggested that the best way to deal with malnutrition was to have a dining room for nursing mothers run in connection with antepartum clinics. The resolution was carried unanimously, as well as others to the effect that allowances should be paid in all maternity cases on the lines of national health insurance, that all local authorities should provide a complete gynecologic service, which would include advice on birth control, and that the minister of health and the British Medical Association should be asked to receive a deputation urging the wider provision of midwifery services and the fuller maintenance and development of child welfare and maternity services. With regard to malnutrition, there is, as the *Times* points out, the great difficulty of defining the condition. Sir F. Gowland Hopkins has said that the nutrition of every race is and has been imperfect.

The Change in Hospital Finance

Addressing the section of Odontology of the Birmingham Medical Institute, Prof. Leonard Gamgee described the great changes in hospital finance which have come about. Less than twenty years ago the voluntary hospitals were supported by endowments and subscriptions, and in some places, as in Birmingham, by workmen's contributions. But the great point was that no patient was ever charged a cent. Now almost every patient is charged a maintenance fee and the hospitals are supported in increasing degree by the cooperative contributions of the class from which the patients are drawn. The distinction between the voluntary and the municipal hospital is that the former is still not supported by the taxes. It is now realized that small contributions from wage earners and others can run hospitals, which are no longer primarily institutions for the treatment of the sick poor but for the treatment of subscribers to contributory systems, the majority of whom could not pay for treatment outside. Would physicians give the same honorary service to a cooperative insurance system as they were willing to give to a pure charity? Mr. Gamgee's answer was that he was glad that the time for making that decision did not come when he was doing active hospital work.

Control of the Sale of the Barbiturates

The tightening up of the regulations governing the sale of sleeping tablets has been strongly advocated by Sir William Willcox, the government toxicologist, and has been under the consideration of the official poisons board. He holds that the barbiturates should be obtainable only on a physician's prescription, that the pharmacist should retain the prescription, and that in no case should a fatal dose be supplied. But other physicians think that the danger is exaggerated and do not agree with all these proposals. While the barbiturates, which are now obtainable from a pharmacist without any formality, should be supplied only on a physician's order, they hold it to be impracticable for a prescription to be obtained for every dose. Also, unless the prescription is endorsed "not to be repeated," it is the property of the patient. This raises the difficulty that the same prescription can be produced at any number of pharmacists' shops and an addict can thus obtain as much of the drug as he wants.

Children Taught to Wear Gas Masks

The possibility of another war is a common topic and among the horrors depicted are air attacks on cities, in which poison gas will play a part. It is stated that the war office is about to issue instructions to the civilian population as to their action in case of air attacks. Forty children have actually been taught how to wear gas masks in a mimic gas attack to which fireworks, a smoke screen made by smoke bombs, marked "gas zones," nurses and stretchers gave a touch of realism. The demonstration was held on Peckham Rye, one of London's open spaces. Those who took part in it were members of the British Red Cross Society and children of members. Commandant A. E. Skinner of the society showed the children, with the aid of a blackboard, how to wear the masks. Parents were invited to the demonstration, the idea of which was to train the children in discipline in the event of a real gas attack, and in the necessity and urgency of respiration. Oxygen cylinders were available.

Subsequently the British Red Cross Society repudiated responsibility for the demonstration. It understood that the press wanted to see how voluntary aid detachments were trained and were willing for this to take place. But the society gave no authority whatever for children to take part in a mimic gas attack. The society has nothing whatever to do with the training of children. It is contrary to its policy and this demonstration had nothing whatever to do with the society.

PARIS

(From Our Regular Correspondent)

Nov. 26, 1934.

A Bill to Limit the Number of Medical Students

Prof. George Portmann of Bordeaux has just submitted a bill, in his capacity as senator, which will be discussed this fall before the senate and the house of representatives. The proposed law will greatly limit the number of medical students, which has increased from 8,182 in 1929 to 10,338 in 1933. The number of graduates in 1930 was 1,076 and in 1933 it rose to 1,397. The ratio of the number of physicians in France to the population is 1 to 1,645. In Paris alone there is one physician to 630 civilians.

Germany has recently decided to limit the number of students in the universities to 15,000 instead of 25,000 as in 1933. This would appear to be too radical a limitation in the case of France.

Efforts have already been made by the various French medical schools to cut down the number of students. Instead of oral examinations, which are often unfair to the student, a system of written examinations is being introduced. So far it has been limited to the first two of the six years medical course. Only recently the number of years required has been changed from five to six. Many complaints have been received as to the laxity of the method of examinations, but an effort is being made to meet this just criticism. Professor Portmann believes that all these measures are inadequate, and, in view especially of present economic conditions, some corrective measures are imperative.

At the present time a medical student must have passed examinations equivalent to at least the first two years of the college courses given in the majority of the American universities. The Bachelor of Arts degree requires only two years of study at the French lycées or colleges, but the number of required courses is more than equivalent to the first two years of the American college courses. This degree is required before a student can enter the medical school. After entering, there is an obligatory preliminary year devoted to physics, biology and chemistry. These courses are not given at the medical school proper.

The new law proposes to have a committee composed of the heads of the departments of war, navy, colonies and education. These shall determine the number of medical students needed each year. If they decide, for example, that the number should be 1,000 for a given year, the 1,500 students receiving the best examination averages at the end of the preliminary medical year (physics, biology and chemistry courses) shall be permitted to enter the first year of the medical course. The 1,000 students (of the original 1,500) receiving the highest averages in the preliminary (basic sciences) year shall be permitted to enter the first medical school year.

In 1900 there were 16,815 physicians in France itself, and in 1928 this number had risen to 27,000, whereas there was an increase in population of only two million. The University of Paris medical school alone has more than 4,000 students, all under the supervision of a single faculty.

Is Social Insurance a Success?

In the November 14 issue of the *Concours médical*, a very instructive article by Dr. P. Dally gives some statistical data that will be of value in the evaluation of proposed legislation in the United States to establish sickness insurance under state or national supervision. When Bismarck in 1886 proposed such a law in Germany, his object was to neutralize the rapidly growing Socialist party, which demanded higher wages rather than compensation for illness. Laws of the latter kind have never been popular with the working classes, and even less so with the medical profession. According to Dally, such legislation was due to political considerations that aimed primarily to distribute public funds to the masses. The care of the sick was a secondary consideration. None of these laws had as their object public health in the larger sense; that is, no efforts were made in the direction of preventive measures. This seems rather paradoxical when one recalls that such efforts would have only resulted in a decrease in the amount of money needed to carry out the laws and thus, in the final analysis, have lightened the burden of those who were contributors and beneficiaries of the fund. These laws, especially in countries like Germany and Austria, where they were first employed, are still in an experimental stage, as evidenced by the constant changes that are being made, as the result of the demands of the employer and the employee.

A vital error lies in the fact that these laws attempt to solve an intangible question of morals such as the reciprocal relation of patient and physician. The insured worker in many instances tries to get back the money he has paid by malingering, by exaggeration of the time needed to recuperate and by dissatisfaction with the percentage of his invalidity which has been decided on by the medical examiners. Kirschner, a German surgeon of international reputation, says "Our country is like a huge hospital, a community of invalids, where every individual tries to grab as much as possible out of the big indemnity bag into which he pours his contributions." One out of every seven persons is a beneficiary of the sick relief funds, in Germany. There have been as many officials to administer these funds as beneficiaries in Germany. This is already the complaint in France, even though the law is only four years old. In countries where insurance against illness was optional, it has become obligatory. Where formerly there was only a patient and a physician, the decisions of the latter are subject to supervision by a medical government employee. There is constant friction in countries where there is obligatory sickness insurance. In Austria the law has been modified twenty-eight times since its passage in 1887.

This conflict will cease perhaps, some day, when the national insurance agencies have at their disposal a corps of medical government officials who devote their entire time to the care of the assured. There will be no further conflict, because there will no longer exist a medical profession in the present interpretation of the words. A better method, perhaps, of utilization of the large funds of these state insurance departments would be to create large diagnostic centers and hospitals, which would permit better care to be given to the worker. Some efforts are being made in this direction.

There are few countries in which the medical profession has neither been consulted in the passage of legislation for sickness insurance, nor even consulted from time to time in the management of the departments. This is certainly true of France.

Neither the assured nor the medical profession is satisfied with social insurance laws. Among nineteen countries of Europe this is the opinion in all except Bulgaria, Denmark, France and Holland. In Yugoslavia the insured is satisfied, but not the medical profession. Some very instructive tables accompany the article of Dally, from which some data are as follows:

Free choice of physicians: Yes in Bulgaria, France, Great Britain, Holland, Norway, Sweden and Switzerland. No in Germany, Esthonia, Hungary, Latvia, Poland, Czechoslovakia, Yugoslavia and the city of Vienna.

Who is obliged to be insured? In Germany, every worker earning less than $900, in France all less than $1,100, in Great Britain all less than $1,200 and also all manual workers. In Germany, this means nearly one third, in France about one fifth and in Great Britain about two fifths of the total number of inhabitants.

If those who have charge of social insurance would not neglect to utilize the vast funds at their disposal in greater efforts to prevent disease, much good could be accomplished, is the conclusion of Dr. Dally.

VIENNA

(From Our Regular Correspondent)

Oct. 23, 1934.

The Tenth Convention of Physicians of the Alpine Region

The tenth annual meeting of physicians in the region of the Alps was held in Graz, October 8-10. More than 400 of the leading physicians from Austria, Switzerland and Italy attended. Under the chairmanship of Prof. Dr. Wittek of Graz a memorial tablet in honor of the deceased surgeon Prof. Hacker was unveiled. The first subject discussed was the problem of thrombosis and embolism. Because of the illness of Prof. Dr. Maresch, chief pathologist of the Vienna General Hospital, the paper was read by his assistant Dr. Feller. He emphasized that the nature of this dangerous disorder has not yet been fully explained. The assertion that this condition has enormously increased was investigated on the basis of 70,000 postmortem reports. The assertion proved to be greatly exaggerated. "Compared to the prewar period, only a slight increase could be ascertained." Professor Maresch assumes that this increase is caused by the "over aging" of the population; that is, the relative and absolute increase in the higher age groups as the result of the decrease in the birth rate and an increase in the longevity. He also emphasized the relation of the dis-

and that in no case should a fatal dose be supplied. But other sures are imperative.

order to meteorological factors. In cooperation with the director of the Central Meteorological Institute in Vienna, it could be established by exact analysis of all the characteristics of the weather that there is a connection between the incidence of the disorder and abnormal temperatures and barometric conditions, particularly in regions with damp and hot sea winds.

The treatment and clinical aspects of embolism and thrombosis was discussed by the Viennese clinicians Eppinger as internist and Ranzi as surgeon. The first speaker discussed the etiology. The development is especially likely during prolonged rest in bed, after operations, bone fractures and deliveries. All these conditions involve injuries of the tissues, which produce changes in the blood vessels, which in turn favor the development of thrombi. For this reason, attempts should be made to accelerate the circulation. Great stress has been placed in recent years also on the treatment that employs exercises and aims to shorten the patient's rest in bed as much as possible. Massage of the extremities has been recommended particularly after operations. The surgical aspects were discussed by Professor Ranzi and Professor Denk, and especial attention was called to the significance of previous operations. Getting out of bed early after operations is to be recommended whenever possible, particularly in patients over 45 years of age.

After that, the hygiene of large cities was discussed. Dr. Gegenbauer, chief of the health department of the city of Vienna, reported on the sources of infection of abdominal typhoid.

Prof. Dr. Hamburger of Vienna spoke on the significance of the formation of habits in clinical pathology. He showed that on the basis of certain habits that are formed during childhood (tic, vomiting, morbid sleepiness) there develop certain disorders, in the treatment of which psychic factors and suggestion play an important part.

Dr. Kauders of Baden, near Vienna, discussed "light diet," which is indicated in disturbances of the digestive tract, in renal diseases, in circulatory disturbances and in hormone disorders. It is possible that a light diet which is deficient in vitamins may lead to the development of scurvy-like conditions; also a hypersensitivity may develop to some of the constituents of the light diet (milk, eggs). The patient may develop urticaria, pruritus, transitory edema and even angina pectoris and gastric hemorrhage. Every restricted diet, whether a vegetable diet, raw diet, Gerson diet, salt-free diet (Noorden) or fat diet, requires careful adaptation to the individual case.

The causes and the treatment of anemia were discussed by Dr. Naegeli of Zurich. Modern diagnostic methods make possible a precise differential diagnosis and accordingly the prescription of iron and arsenic, of cod liver oil or of liver preparations; and in acute conditions blood transfusions.

Professor Schinz of Zurich, the chairman of the convention of roentgenologists in Switzerland, described his research on the roentgenologic diagnosis of diseases of the vertebral column. Roentgenoscopy reveals entirely new aspects in the case of tumors and of tuberculosis of the vertebrae. Accordingly, the treatment has made considerable progress in these conditions.

"Glandular fever," which in children was first described by Pfeiffer, was discussed by Professor Jagić of Vienna. In recent years this disorder has been observed also quite frequently in adults. The patients developed fever, also swelling of the glands in the region of the lower jaw, of the neck and of the axilla, splenic tumor and various changes in the blood picture somewhat like those in genuine forms of leukemia. The prognosis is generally favorable.

Professor Berger and Dr. Grill of Graz spoke on the artificial production of pernicious anemia in animals by prolonged poisoning with carbon monoxide gas. In a human case, in which the cause was recognized, cure was effected by the removal of the cause (poisoning with carbon monoxide of several years' duration) and by liver diet.

Prof. Dr. Hiess of Klagenfurt spoke on prophylaxis during pregnancy. He stressed the necessity of at least two examinations of the pregnant women before delivery. Tuberculosis and even malignant and benign tumors do not exclude a normal delivery, provided the prophylaxis has been adequate. Especial attention should be given to the "old primiparas," but the author has seen normal deliveries in women who were nearly 50 years old.

The calculation of the day of delivery was elucidated by docent Dr. Kraul. Nine months plus seven days after the last menstruation, the well known formula of Naegeli was taken as the basis in 22,000 cases within the last eight years in the First Women's Clinic of Vienna. It was found that this formula gave only an average duration. The opinion about "past term" infants, that is, the dependence of weight and length of the newborn on the duration of the pregnancy, could not be corroborated. The deviations from the calculated date of birth are due to differences in the constitution. The average duration of 266 days can be subject to considerable changes, between 258 and 297 days.

Organization of the Medical Profession of Austria on the Basis of the New Organization of the State

Since the political revolution in Austria in February 1934, the entire direction and constitution of the state have undergone fundamental changes. Austria is ruled on the basis of "estates" (corporate bodies) that correspond somewhat to the medieval crafts or guilds. Persons connected with sanitation in the future will be organized and united in two guilds, the "health guild" and the "physician's guild," in spite of the fact that certain formal connections may exist between the two as far as physicians are concerned. The "health guild" includes all private physicians, veterinarians, midwives and the personnel assisting the physicians. Excluded are all persons who are in public service, since these are already incorporated in the "official's guild." The representatives of this "health guild," who are to function in the councils (called Culture Council), in order to look out for the interests of this guild in legislation and in other governmental activities, are appointed (not elected) by the minister for social organization. The "physician's guild" itself is a professional organization in the "health guild." The organ of this physician's guild is the "physician's chamber" for professional and economic concerns. These chambers are divided into two sections (*a*) for the court of honor (medical ethics) and (*b*) for economic problems. The regional institutions of the physicians remain in existence as such but the state or provincial representations are to be given a unified "führung" (leader). This "leader" is appointed and he is assisted by a council, the members of which at first are likewise appointed. On the whole, the principle of election, which formerly dominated everywhere, has been completely done away with, authority rules. However, it should be added here that all these regulations are only a transition to a "limited democracy." A (provisional) physician's "federal economic council" is to be created, the members of which are to be appointed by the government. The latter is to select men who appear suitable, but they must belong to the "fatherland front," which is considered the bearer of the political power in Austria. All former political parties have been dissolved voluntarily or by law; almost every one in Austria who does not wish to give the appearance of being an enemy of the state must be a member of the "fatherland front," physician's likewise. In this manner the new physician's organization is clearly political.

The new organization has not been completely accepted as yet. It is criticized by the medical profession and by others, by persons who are not at all unfriendly toward the new aims but who only wish to correct defects. Medical circles are under the impression that the official character of the physician's

chamber will be a hindrance in the representation of purely medical interests. Formerly the economic organization was energetically active in such matters, and because of its independence from the government it was rather strong and quite successful in its activity for the physicians. Since a reform of the krankenkassen and of the social insurance system is to be expected in the near future, and also a new law for the medical profession, the fact that many experienced and competent members of the old physician's chamber and medical organizations have not been reappointed has created a most disagreeable surprise. It is feared that the efforts made by physicians for many years to improve their condition may now fail completely. At any rate, many physicians are in grave doubt about the future. Everywhere the tendency is noticeable to pension the older men and to force the younger men who formerly had different political convictions than the now ruling elements out of their positions without pensions. This applies particularly to former social democrats and to national socialists but also to nonpolitical Jews, who in this manner could be forced into a hidden "numerus clausus."

BUENOS AIRES

(From Our Regular Correspondent)

Oct. 20, 1934.

Medical Congresses in Argentina

The Fifth National Congress of Medicine of Argentina was held in Rosario, September 2-7, with a large attendance. The official topic was "Amebiasis," which was presented by Drs. Castex, Staffieri and Franchini (clinical aspects), Marotta (surgery) and Greenway and Mazza (parasitology), as official speakers. Papers were read by Drs. T. M. Rivera on filtrable viruses, Brauer on collapsotherapy, Fonesca on mycotic allergy, Binet on the suprarenals and the metabolism of sulphur, and Lipschütz on the gonadotropic action of the hypophysis. Members of the sections of histology, pathologic anatomy, physiology and biochemistry, hygiene, legal medicine, medical clinics, pediatrics, surgery, ophthalmology, urology, otorhinolaryngology, pharmacy, odontology and naval and military medicine, convened in several meetings. Dr. B. A. Houssay spoke on functions of the anterior lobe of the hypophysis and Dr. Cibils Aguirre on antidiphtheritic vaccination. The next national congress will meet in Córdoba in 1938.

The first Congress on Medical Economics, organized by the Colegio Médico, a medical society of Buenos Aires, with the cooperation of similar medical societies of Argentina, was held, June 24-30, in Buenos Aires. Important problems of collective medical practice were discussed. The members resolved to have a fixed tariff of fees, in relation to the economic conditions of patients, who were classified as "poor," "justified to have a 60 per cent reduction in the schedule," and "able to pay the whole fee assigned in the schedule." They also resolved to have the City Hospital and similar institutions as centers for free medical care. There were various general motions, such as on the preparation of a national sanitary code. The existence of sanatoriums belonging to medical cooperative and medical mutual societies was approved. The members stated that the medical profession in Argentina is overcrowded and advised the limitation of the number of students to medical schools in relation to the health demands of the country, as well as the selection of candidates, according to their preparation and ethical background. The suppression of treaties of reciprocity with various countries was advised as an aim of securing practice for Argentine physicians, those graduated from Argentine schools as well as those returning home with diplomas from accredited schools in other countries.

The annual Congress of Surgery will meet October 21. The ninth Pan-American Sanitary Conference, organized by a committee under the chairmanship of Dr. G. Araoz Alfaro, with Drs. M. Sussini and M. Obarrio as vice presidents and Drs. A. Zwanck and A. Sordelli, as secretaries, will meet November 12-22.

Lectures by Foreign Professors

Well known foreign professors were presented to the Congress of Medicine recently held in Rosario. During their stay in Argentina the following delivered lectures: Prof. Léon Binet, teacher of physiology of the Faculty of Medicine of Paris, a course of twelve lectures on physiology of the lung, oxygenotherapy, intestinal occlusion, hyperthermia, and some other topics. Prof. T. M. Rivers of the Rockefeller Institute on filtrable viruses; his lectures were delivered in Spanish. Prof. Bastos Ansart of Madrid, on cerebral surgery. Prof. L. Brauer of Hamburg, on physiology of exercise, aeronautic medicine and collapsotherapy; his lectures were delivered in Spanish. Professor Franchini of Modena, on amebiasis. Professor Bottazzi of Naples, on Leonardo da Vinci, factors of alimentation, and muscular tonus. Prof. O. da Fonseca of Rio de Janeiro, on parasitology. Professor Lichtenberg of Berlin, on urinary pathology and pyelography. Professor Munk of Berlin, on vascular and renal pathology.

Mottled Enamel

Drs. Goldenberg in 1917 and Bergara in 1927 reported the results of their experiments on the action of fluorine. Dr. Chaneles in 1930 reported results of a thorough study of the action of fluorine on the teeth of rats. Research has been focused this year on the geographic distribution of mottled enamel in relation to the contents of fluorine in drinking water in Argentina. Dr. R. Erausquin reviewed and completed a map prepared by Dr. Damon, showing the geographic distribution of the dental condition. Dr. J. M. Muñoz performed an analysis of drinking waters in the zones in which the inhabitants have mottled enamel. He found a content of 2.4 mg. of fluorine per thousand cubic centimeters in drinking waters in those zones, by working with Casares' method. Dr. Trelles, however, made some objections on the exactness of the method (*Semana médica*, October 4).

Anaerobic Actinomyces

Negroni has verified the failure to obtain cultures of either Actinomyces or Actinobacilli in aerobic mediums in many cases of actinomycosis with clubs. He prepared cultures in anaerobic mediums, in agar and dextrose, and succeeded, in seven cases out of ten, in obtaining cultures of Streptothrix israeli, to which he gives the designation Proactinomyces israeli, following the classification of Actinomycetaceae given by Jensen in 1931. The results of his work seem to indicate that mycetoma may be caused by Actinomyces, by Actinobacilli or by Proactinomyces.

Tuberculosis and Erythema Nodosum

Dr. A. Arenas recently reported before the Sociedad de Biología the results of his experiments on erythema nodosum. The author was able to obtain visible tubercle bacilli, after the first series of inoculations subcutaneously and by means of the lymph nodes, in only one case out of seven cases of erythema nodosum. Acid-fast bacilli of an increasing virulence appeared, however, after successive inoculations from animal to animal, in the material of five out of that of the seven cases.

Deaths

Dr. J. M. Escalier, formerly head of the Rivadavia and Durand hospitals, and ex-president of the Asociación Médica Argentina, born in Bolivia, died August 15 at the age of 70. ——Dr. J. M. Zubizarreta, formerly head of the pediatric department of the Hospital de Niños la Casa de Expósitos, and ex-director of public welfare of the federal capital, died October 13.——Dr. Ernesto Romagosa, professor of surgical clinics of the Faculty of Medicine of Córdoba, ex-dean of the faculty and ex-rector of the university, died recently.

Marriages

CECIL STUART EUGENE TOUZEL, Fort Worth, Texas, to Miss Gwendolen Williamson Cole at Point Fortune, Que., Canada, August 23.

LEONARD KIRK MCMURTRY, Evansville, Ind., to Miss Ruby Ray Douglas of Princeton at Henderson, Ky., September 15.

JASPER STEWART HUNT, Charlotte, N. C., to Miss Eleanor Louise Bomar of Spartanburg, S. C., October 6.

LUTHER C. MITCHELL, Sandersville, Ga., to Miss Lamartine Christian of Madison in Augusta, September 30.

JOHN W. PYLES to Miss Erica Tanner, both of New Martinsville, W. Va., in Pittsburgh, October 12.

EDWARD VICTOR DENNEEN, New York, to Miss Julia Theresa Corcoran of North Bay, N. Y., October 17.

JOSEPH D. CULBERTSON, Norton, Va., to Miss Flossie Bradle of Eureka, Ill., at Pekin, Ill., October 13.

BEVERLEY EUGENE SMITH, Baltimore, to Miss Mary Winifred Davis of Oxford, Miss., October 1.

FELIPE ANDRES MARTINEZ to Miss Marguerite Gertrude Kurdle, both of Baltimore, August 8.

SIDNEY S. BERKOWITZ, New York, to Miss Miriam H. Rosenfeld of Philadelphia, October 5.

LOREN K. MEREDITH to Miss Elizabeth Ruth Brinton, both of Des Moines, Iowa, October 12.

FRANCIS M. CONWAY, Brooklyn, to Miss Jean Mayer of Montclair, N. J., September 12.

LEO E. GIBSON, Syracuse, N. Y., to Miss Pauline Remington of Potsdam, N. Y., October 3.

SEWELL B. COULSON, Waldron, Ind., to Miss Helen Jackson at Indianapolis, September 9.

RAY S. CRIST, Port Townsend, Wash., to Miss Josephine E. Reasor of Seattle, August 25.

WILLIAM F. BELL, Kalvesta, Kan., to Miss Winefred Beeman at St. Louis, September 12.

CARL H. SENN, Williamsport, Pa., to Mrs. Helen Hayes of Philadelphia, August 20.

WEBSTER K. ROSS to Miss Vina Conley, both of La Grande, Ore., August 19.

JAMES R. HART to Miss Myra Disterdick, both of Erie, Pa., August 22.

JOHN J. MRAZ to Miss Jannette Harkins, both of Erie, Pa., August 29.

Deaths

August Frederick Jonas ⊕ Omaha; Bennett College of Eclectic Medicine and Surgery, Chicago, 1877; Ludwig-Maximilians-Universität Medizinische Fakultät, Munich, Bavaria, Germany, 1884; in 1901 third Vice President, in 1906 and in 1911 member of the House of Delegates, and in 1912-1913 Chairman of the Section on Surgery of the American Medical Association; professor of surgery, emeritus, University of Nebraska College of Medicine; member of the American Surgical Association and the Western Surgical Association; fellow of the American College of Surgeons; served during the World War; at various times on the staffs of the Nebraska Methodist and the Douglas County hospitals; aged 76; died, November 13, of cerebral hemorrhage.

Herbert Melville Little, Montreal, Que., Canada; McGill University Faculty of Medicine, Montreal, 1901; professor of obstetrics and gynecology at his alma mater; member and formerly vice president of the American Association of Obstetricians, Gynecologists and Abdominal Surgeons; member of the American Gynecological Society; fellow of the American College of Surgeons; gynecologist to the Montreal General Hospital; gynecologist and obstetrician to the Royal Victoria Hospital, formerly known as the Montreal Maternity Hospital of which he was superintendent; on the editorial board of the *Canadian Medical Association Journal;* aged 56; died, October 11.

Creswell T. Pigot ⊕ Roundup, Mont.; Western University Faculty of Medicine, London, Ont., Canada, 1900; member of the House of Delegates of the American Medical Association, 1922-1934; past president of the Medical Association of Montana; secretary of the Musselshell County Medical Society; served during the World War; city and county health officer; fellow of the American College of Surgeons; on the staff of the Musselshell Valley Hospital; aged 55; died, October 12, of pneumonia.

George Forrest Martin ⊕ Lowell, Mass.; New York Homeopathic Medical College and Hospital, 1890; fellow of the American College of Surgeons; member of the school committee, 1894-1895; in 1909 member and in 1910 chairman of the board of health of Lowell; senior surgeon to the Lowell General Hospital; for many years chairman of the board of trustees of the State Infirmary, Tewksbury; aged 71; died, November 4, of coronary thrombosis.

Stanley Stillman, San Francisco; Cooper Medical College, San Francisco, 1889; member of the California Medical Association, the American Surgical Association and the Pacific Coast Surgical Association; fellow of the American College of Surgeons; professor of surgery emeritus, Stanford University School of Medicine; aged 73; consulting surgeon to the Lane Hospital, where he died, October 15, of pneumonia.

William Scott Campbell, Chicago; Rush Medical College, Chicago, 1885; member of the Illinois State Medical Society; past president of the Tippecanoe County (Ind.) Medical Society; for many years health commissioner of Tippecanoe County, Ind.; aged 77; died suddenly, November 3, at his home in Oak Park, Ill., of angina pectoris.

Stephen August Stadler, Kansas City, Mo.; St. Louis University School of Medicine, 1917; member of the Missouri State Medical Association; served during the World War; on the staffs of the Kansas City General and St. Joseph hospitals; aged 44; died, November 1, of hemorrhage from esophageal varices and cirrhosis of the liver.

Arthur Freeman ⊕ Surg., Lieut. Commander, U. S. Navy, retired, Washington, D. C.; Vanderbilt University School of Medicine, Nashville, Tenn., 1914; entered the Navy in 1917 and retired in 1932 for incapacity resulting from an incident of service; aged 48; died, October 20, in the U. S. Naval Hospital, of esophageal abscess.

Paul Ewing McDonnold ⊕ P. A. S., Lieut. Commander, U. S. Navy, retired, Riverside, Calif.; Columbian University Medical Department, Washington, D. C., 1898; entered the navy in 1901 and retired in 1910 for incapacity resulting from an incident of service; aged 61; died, September 20, of chronic rheumatic endocarditis.

Arthur C. Merriam, Washington, D. C.; Columbian University Medical Department, Washington, 1889; served during the World War; formerly connected with the U. S. Public Health Service; aged 68; died of drowning, coronary thrombosis and embolus when he fell from a yacht in the Anacosta River, October 11.

James Bernard O'Neill, Portland, Maine; Harvard University Medical School, Boston, 1887; member of the Maine Medical Association; veteran of the Spanish-American War; formerly on the staff of the Maine Eye and Ear Infirmary; aged 74; died, October 20, of heart disease and arteriosclerosis.

Lester F. Newbern, Monroe, Mich.; State University of Iowa College of Medicine, Iowa City, 1908; member of the Michigan State Medical Society; past president of the Monroe County Medical Society; on the staff of the Monroe Hospital; aged 50; died, November 11, of heart disease.

Richard Aloysius McGillicuddy ⊕ Turners Falls, Mass.; Baltimore Medical College, 1903; for many years member and chairman of the school board; on the staff of the Farren Memorial Hospital, Montague City; aged 55; died, November 4, of chronic valvular heart disease.

John Victor Lynn, Ridgefield, N. J.; Hahnemann Medical College and Hospital, Chicago, 1905; member of the Medical Society of New Jersey; served during the World War; aged 58; on the staff of the Holy Name Hospital, Teaneck, where he died, November 13, of heart disease.

Eugene A. Harris ⊕ Navasota, Texas; Tulane University of Louisiana Medical Department, New Orleans, 1890; president of the Grimes County Medical Society; on the staff of the Brazos Valley Sanitarium; aged 65; died suddenly, October 26, of heart disease.

William T. Morgan, Braddock, Pa.; University of Maryland School of Medicine, Baltimore, 1884; for many years president and on the staff of the Braddock General Hospital; aged 76; died, October 9, at his home in Swissvale, of carcinoma of the stomach.

Burgett Woodcock, Greeley, Colo.; Medical College of Alabama, Mobile, 1896; member of the Colorado State Medical Society; served during the World War; formerly on the staff of the Greeley Hospital; aged 59; died, October 19, of heart disease.

Joseph Wright Allen, Monongahela, Pa.; Cleveland Homeopathic Medical College, 1907; member of the Medical Society of the State of Pennsylvania; on the staff of the Memorial Hospital; aged 52; died, August 11, of cerebral hemorrhage.

Leigh Hubbard Womble Jr., Mitchell, Neb.; University of Nebraska College of Medicine, Omaha, 1933; aged 24; died, October 18, of a gunshot wound received in the premature discharge of a shotgun in the hands of a hunting companion.

Julian Raymond Blackman, Salt Lake City, Utah; Johns Hopkins University School of Medicine, Baltimore, 1906; served during the World War; aged 56; died, November 11, in the Veterans' Administration Hospital, of angina pectoris.

Joseph Jordan Robertson ⊕ Kingsville, Texas; University of Texas School of Medicine, Galveston, 1913; served during the World War; aged 48; on the staff of the Kleberg County Hospital, where he died, October 5, of nontropical sprue.

Howard F. Hansell, Philadelphia; Jefferson Medical College of Philadelphia, 1879; emeritus professor of ophthalmology at his alma mater; formerly ophthalmologist to the Philadelphia Hospital; aged 78; died, November 5, of heart disease.

George Leslie Lynch, Amador City, Calif.; College of Physicians and Surgeons of San Francisco, 1906; for many years county health officer; aged 60; died, October 6, in the Sutter Hospital, Sacramento, of streptococcic septicemia.

Samuel L. Friduss ⊕ Chicago; College of Physicians and Surgeons of Chicago, School of Medicine of the University of Illinois, 1897; on the staff of the Englewood Hospital; aged 64; died, November 10, of carcinoma of the bladder.

Thomas W. Moorhead ⊕ Terre Haute, Ind.; College of Physicians and Surgeons of Indiana, Indianapolis, 1876; aged 78; formerly on the staff of St. Anthony's Hospital, where he died, November 8, of carcinoma of the rectum.

Albert Ward Preston ⊕ Middletown, N. Y.; Columbia University College of Physicians and Surgeons, 1896; on the staff of the Elizabeth A. Horton Memorial Hospital; aged 65; died, October 12, of coronary thrombosis.

James A. Clark ⊕ Chicago; Chicago Medical College, 1885; aged 73; formerly on the staff of St. Anthony's Hospital; on the staff of the West Side Hospital, where he died, September 29, of uremia, following a prostatectomy.

William I. Timmer, Cicero, Ill.; Chicago College of Medicine and Surgery, 1911; member of the Illinois State Medical Society; on the staff of the West Suburban Hospital; aged 54; died, November 14, of heart disease.

Geoffrey Orlando Tunison, Oxford, N. J.; Jefferson Medical College of Philadelphia, 1885; member of the Medical Society of New Jersey; aged 71; died, November 4, of septicemia, prostatitis and arteriosclerosis.

William Ralph Eddleman, Anna, Ill.; University of Tennessee College of Medicine, Memphis, 1912; aged 46; died, October 17, as the result of injuries received in an automobile accident and of cirrhosis of the liver.

Edward Walker Blackburn, Ozark, Ark.; Vanderbilt University School of Medicine, Nashville, Tenn., 1900; member of the Arkansas Medical Society; also a druggist; aged 59; died, October 31, of cerebral hemorrhage.

William H. Pauley, St. Louis; Marion-Sims College of Medicine, St. Louis, 1896; member of the Missouri State Medical Association; aged 60; died, October 21, in the City Hospital, of cerebral hemorrhage.

Charles Henry Pope ⊕ St. Louis; Barnes Medical College, St. Louis, 1904; served during the Spanish-American and World wars; aged 58; was found dead in his automobile, November 3, of heart disease.

Fred Fernando De Vore, Toledo, Ohio; Medical College of Ohio, Cincinnati, 1900; served during the World War; for many years county health officer; aged 55; died suddenly, October 21, of heart disease.

James Sigel Wiltshire, Londonderry, Ohio; Starling Medical College, Columbus, 1897; member of the Ohio State Medical Association; aged 74; died, October 30, of chronic nephritis and prostatitis.

James Oliver Mohn, Gowen City, Pa.; Jefferson Medical College of Philadelphia, 1894; member of the Medical Society of the State of Pennsylvania; aged 66; died suddenly, October 2, of angina pectoris.

Joel Sperans, Los Angeles; University of Buffalo School of Medicine, 1905; aged 70; died, September 6, in the Cedars of Lebanon Hospital, of uremia, chronic nephritis and hypertrophic prostatitis.

Albert S. Munson, DeLand, Fla.; Bennett College of Eclectic Medicine and Surgery, Chicago, 1873; member of the Florida Medical Association; aged 83; died, October 22, of bronchopneumonia.

Edwin K. Wilson, Romney, W. Va.; Jefferson Medical College of Philadelphia, 1877; member of the West Virginia State Medical Association; aged 80; died, October 14, of cardiac insufficiency.

James Edward Johnson, Grantsburg, Wis.; Marquette University School of Medicine, Milwaukee, 1914; on the staff of the Community Hospital; aged 53; died, November 4, of heart disease.

John Brown Harris, Nashville, Tenn.; Vanderbilt University School of Medicine, Nashville, 1901; aged 84; died, November 5, of uremia and fracture of the right femur as the result of a fall.

James Lafayette Ledgerwood, Tishomingo, Okla.; Vanderbilt University School of Medicine, Nashville, Tenn., 1886; aged 73; died, July 27, in the Hardy Hospital, Ardmore, of uremia.

William F. Schwartz, Baltimore; University of Maryland School of Medicine, Baltimore, 1907; aged 49; died, October 25, in St. Joseph's Hospital, following an operation for gastric ulcer.

David John ⊕ Yonkers, N. Y.; L.R.C.P., London, and M.R.C.S., England, 1882; for many years on the staff of St. John's Hospital; aged 76; died, November 10, of heart disease.

Francis Marion Granger, Russell, Ohio; Medical College of Ohio, Cincinnati, 1873; member of the Ohio State Medical Association; aged 87; died, November 14, of heart disease.

George P. Gerichten, San Francisco; California Medical College, Oakland, 1901; aged 59; died, September 6, in the Franklin Hospital, of acute atrophy of the liver.

Fred E. Tuttle ⊕ Cattaraugus, N. Y.; University of Buffalo School of Medicine, 1880; aged 77; died, July 10, of bronchopneumonia and carcinoma of the prostate.

Othello C. Scarborough, Joplin, Mo.; University of Louisiana Medical Department, New Orleans, 1874; aged 84; died, October 11, of chronic valvular heart disease.

Stephan Stephanson, The Pas, Manit., Canada; Manitoba Medical College, Winnipeg, 1912; aged 48; died, September 18, in Winnipeg, of acute appendicitis.

Henry Franklin McCool, Evansville, Ind.; Miami Medical College, Cincinnati, 1887; aged 71; died, October 24, in St. Mary's Hospital, of heart disease.

Charles Frank Rotter ⊕ St. Louis; Marion-Sims College of Medicine, St. Louis, 1896; aged 73; died, October 7, of chronic myocarditis and nephritis.

Thomas Franklin Oates ⊕ Mexia, Texas; College of Physicians and Surgeons, Baltimore, 1884; aged 78; died, September 16, of heart disease.

Wheeler Hayes Melvin, Los Angeles; University of Illinois College of Medicine, Chicago, 1905; aged 52; died, September 14, of pneumonia.

Dorothea A. Storck, Indianapolis; Hahnemann Medical College and Hospital, Chicago, 1913; aged 58; died, September 21, of acute nephritis.

Augustus P. Myers, Mobile, Ala.; Homeopathic Medical College of Missouri, St. Louis, 1888; aged 76; died, November 1, of arteriosclerosis.

George W. Bodey, North Lewisburg, Ohio; Kentucky School of Medicine, Louisville, 1892; aged 69; died, November 8, of heart disease.

William F. Quinlivan, Philadelphia; Maryland Medical College, Baltimore, 1907; aged 54; died, September 8, of cerebral arteriosclerosis.

Walter Wilbur, Lynden, Wash.; University of Michigan Medical School, Ann Arbor, 1881; aged 84; died, August 23, of heart disease.

F. C. William Obert, East Alton, Ill.; American Medical College, St. Louis, 1890; aged 71; died, October 16, of arteriosclerosis.

James Oscar Meharg, Fort Worth, Texas; Fort Worth School of Medicine, 1905; aged 58; died, September 21, of carcinoma.

William S. Price, Tangier, Ind. (licensed in Indiana in 1897); Civil War veteran; aged 90; died, October 28, of senility.

Herman Partsch, Berkeley, Calif.; University of California Medical Department, 1884; aged 84; died, September 6.

Correspondence

THE LANGUAGE OF MEDICINE

To the Editor:—The last paragraph of the editorial The Language of Medicine in the September 15 issue of THE JOURNAL is so important and interesting that more should be written about it.

Even if the language is far from perfect, an article written with the sincere desire to convey information may be interesting and hold the attention of its readers, as may also an article written to entertain. An informative medical article would hardly be suitable for displaying slang; but the writer is often guilty of an equally grave offense—the display of technical learning or high-sounding words.

A research worker who has made a profound study of a subject should not forget that the profession as a whole and even eminent scientists who specialize in other branches know little or nothing about what seems simple to him. When explaining the truth that he has discovered, he must discard every technical term possible and confine himself to simple good English if he is going to get his message across. He must remember that THE JOURNAL is sent to every country in the world and that in some places the doctors are not so well educated as in the United States. Our object must be to spread American culture.

The following paragraph taken from a study of yaws and syphilis will illustrate the point:

"The early metastatic polypapillomatous lesions in yaws are uniform to such an extent as to tend to monotony. The medical observer coming from a nontropical country will at once be reminded of multiple impetigines. The metastatic polypapillomata are raised above the skin's surface seeming to fungate, much more than in syphilitic lesions. This is easy to understand considering their histopathology, i. e., an oedematous, verrucous (acanthotic) plasmoma, like the mother-yaw but of smaller size."

Three questions may be asked about this style of writing:

1. Does this paragraph convey a clear picture of the early symptoms of yaws to the average doctor who has not seen a case?

2. Is such a doctor able to clarify the paragraph by aid of a dictionary?

3. Is a trained medical writer able to reconstruct this paragraph so that it conveys a clear picture to the average doctor? If so, it would be interesting to see it done.

BERTEL SKOU, Manila, P. I.

COMPLICATIONS IN INJECTIONS OF VARICOSE VEINS

To the Editor:—In Queries and Minor Notes in THE JOURNAL, October 6, page 1088, a New York physician tells of having injected 3 or 4 minims (0.2 cc.) of 5 per cent sodium morrhuate into a leg vein and having the vein suddenly disintegrate, allowing the solution to become free in the tissues. Following this an ulcer developed. I too am at a loss to know what he means by a "sudden disintegration of the vein." In my seven years experience in this work, neither in my clinic nor in my private work have I ever seen such an occurrence. During the past year and a half we have used several hundred cubic centimeters of 5 per cent sodium morrhuate in my clinic without a slough. There have been several cases in which at least 0.1 to 0.2 cc. has been deposited in the tissues incident to the various accidents attendant on the injection treatment. Hard, tender to painful masses develop at these sites but none have broken down and sloughed as they did when the combined sugar and salt solutions were used. In cases in which, accidentally, enough solution is injected into the tissues to form a wheal, it is our procedure to inject immediately 2 cc. of a sterile 1 per cent solution of procaine hydrochloride in a four point injection (0.5 cc. each) around the area. This not only serves as a diluent but also acts as an anesthetic to control the burning pain. A firm, pressure dressing is then applied over the area.

G. D. BRAND, M.D., St. Paul.

[The letter was referred to Dr. I. G. Frohman, who replies:]

To the Editor:—The word "disintegrate" was chosen because it describes better exactly the unusual occurrence that took place. I am certain that no sodium morrhuate previously entered the tissues. Earlier injections in the same patient were uniformly successful.

The small vein in question was about one-half by one-eighth inch in dimensions. Aspiration gave blood and the injection proceeded slowly as the vein swelled with the fluid. Suddenly the vessel just disappeared and the blood-colored liquid was free in the surrounding tissues. The patient screamed with pain and would allow no subsequent injection in the area to dilute and anesthesize.

A slough later followed, which was very slow to heal. The patient, who is of a hysterical make up, complained for weeks of intense and agonizing pain. She will allow no surgical treatment or pressure bandage but insists on ointments of varying types. Because of the long-standing pain, I have used butesin picrate, nupercaine and later sulphonated bitumen, scarlet red and balsam.

If there is any explanation for the long standing, severe pain and for the behavior of the venule, I should be glad to hear of it.

I. G. FROHMAN, M.D., New York.

Queries and Minor Notes

ANONYMOUS COMMUNICATIONS and queries on postal cards will not be noticed. Every letter must contain the writer's name and address, but these will be omitted, on request.

ARTERIOSCLEROSIS AND HYPERTENSION

To the Editor:—A man about 40 years of age has always had fairly good health except that a specialist in tuberculosis once made the statement that his lungs showed some fibrosis. A urologist later said that the urine showed shreds, and he gave prostatic massage treatments many times. The patient is zealous in the care of his diet and came to me in 1930 for a small exostosis-like body on the finger, which was roentgenographed with negative results for any solid growth, but it was noted on the film that the radial arteries were distinctly atheromatous, which condition had never been suspected by the heart specialist. I had a check up set of roentgenograms taken this year of both arms, which appear much the same as in 1931; I also had roentgenograms taken of the lower extremities, which show a similar condition of the arteries of lower extremities. He is in the best of health. There has never really been any definite focus of infection determinable. The blood pressure is about 130 systolic, 75 diastolic, but two years ago it was somewhat higher. As previously stated, the patient takes good care of himself in every way. The urine is normal. The Wassermann reaction is negative. The patient does not use whisky. The thing that concerns me is the outlook for a man with so definite an arteriosclerosis. He has asked me how long he will live. Are conditions such as described of frequent occurrence in men so young? Doubtless this condition has been present for many years. It would seem that a heart examination is incomplete without a roentgenogram.

M.D., California.

ANSWER.—The case described is typical of the often forgotten fact that arteriosclerosis of the larger arteries, with or without calcification, is an entirely separate entity from hypertensive disease. In the minds of many there exists a notable confusion of these two diseases. Arteriosclerosis involves the larger vessels, often with no abnormality of the arterial tensions, whereas hypertensive arterial disease involves the smallest arteries and arterioles. Despite the not infrequent coincidence of the two processes, their fundamental independence and individuality warrants emphasis.

The incidence of arteriosclerosis is difficult to evaluate (Sydenstricker, Edgar, in Cowdry, E. V.: Arteriosclosis, New York, Macmillan Company, 1933, pp. 131-151). Arteriosclerotic

changes are more frequent in professional and business groups than in industrial and agricultural workers. The following data from studies regarding the age incidence of arterial thickening in white male and female policyholders afford a good general picture of the relation to age in those persons of moderate or better than moderate means:

Age Groups	Males, Per Cent	Females, Per Cent
20-29 years	6.4	3.2
30-34 years	7.8	5.6
35-39 years	10.0	8.0
40-44 years	12.8	11.1
45-49 years	16.1	15.7
50-54 years	22.9	23.6
55-59 years	28.3	28.4
60 and over	38.4	37.3

Of considerable interest is the lower incidence in females in the younger age groups; this difference disappears at about the average age of the appearance of the climacteric.

Statistical data on the death rate in arteriosclerotic individuals are unsatisfactory because of changing and unstandardized terminology, inaccuracy of diagnosis unless necropsies have been made, and extremely variable methods of tabulation. In the United States registration area the federal Bureau of the Census in 1928 includes arteriosclerosis as a cause of death under the vague and almost meaningless and useless term "other diseases of the arteries." The total mortality rate for all ages was 29 per hundred thousand. Of these deaths 59 per cent occurred in persons 75 years of age or older and 25 per cent in persons in the decade from 65 to 74 years. Thus, 83 per cent of deaths attributable to arteriosclerosis occur after 65 years of age. Overweight, according to the insurance investigations, greatly increases the mortality rate (Dublin, L. I.: *Human Biology*, May 1931, p. 170).

In view of the fact that a little over 12 per cent of men over 40 years of age give evidence of arterial thickening, the case cited cannot be considered unusual. The etiology of this disease is still extremely obscure, which makes prognostication difficult. The fact that the man showed no evidence of cardiac or renal disturbance and had a negative blood Wassermann reaction (which, of course, does not prove the absence of syphilis) and a normal arterial tension, should be encouraging factors in evaluating the prognosis. It is not known whether the frequency of arteriosclerosis is increasing, especially in younger persons. In this connection it may be appropriate to mention that presenile calcification of the sternal cartilages is being noted by roentgenologists far more frequently than formerly. Calcification of these cartilaginous structures is being observed quite commonly in the chest films of young people between 20 and 40 years of age. Perhaps, as a pure and unconfirmed speculation, the far more general and liberal use of vitamin concentrates and sunshine may be regarded as a possible contributing factor to such an unusually early tendency to the deposition of calcium.

Persons may live in good and vigorous health for many years despite marked calcification of the arteries of the extremities. The fact that such changes are demonstrable in the extremities does not necessarily imply that similar or as extensive degeneration has involved the cerebral, cardiac or visceral vessels. This patient should have annual or semiannual electrocardiographic studies, which may give warning of involvement of the coronary arteries.

CORPORA LUTEA IN HEMOPHILIA—TOXOID IN DIPHTHERIA—VERSION IN OBSTETRICS

To the Editor:—1. Does the use of corpora lutea in a male child with hemophilia tend to control this disturbance? 2. Is there a serum or vaccine that will give a life immunity from diphtheria? 3. Do you consider that there is a definite and rather rapid trend toward the use of version to supplant the Scanzoni maneuver in the treatment of persistent occipitoposterior position in obstetrics? Please omit name.

M.D., Alabama.

ANSWER.—1. There are conflicting reports concerning the use of corpus luteum in cases of hemophilia. Hynek (*Ann. de méd.* **14**:122 [Aug.] 1923) observed normal clotting time of the blood in hemophilia after the use of corpus luteum. On the other hand, Neihans (*Schweiz. med. Wchnschr.* **60**:18 [Jan. 4] 1930) found that implantation of whole ovary produced no benefit in this disease but that when pieces of ovary without corpora lutea were implanted there was improvement. Interest in the use of ovarian substance in hemophilia was recently aroused by the reports of Birch (*Proc. Soc. Exper. Biol. & Med.* **28**:752 [April] 1931; Hemophilia and the Female Sex Hormone, THE JOURNAL, July 25, 1931, p. 244; Hemophilia, *ibid.* Nov. 5, 1932, p. 1566). Among nineteen cases of hemophilia treated with ovarian substance, nine were considerably improved, nine showed some betterment and only one failed to respond to treatment. Following the report of Birch a few papers were published reporting improvement in cases of hemophilia after the use of ovarian preparations, but other reports indicated that ovarian substance failed to give relief for this blood dyscrasia. Thus Stetson, Forkner, Chew and Rich (Negative Effect of Prolonged Administration of Ovarian Substances in Hemophilia, THE JOURNAL, April 7, 1934, p. 1122) reported on the use of ovarian substance or estrogenic substance in seven cases of hemophilia. In spite of the fact that large amounts of eight different preparations were used, in no instance was the coagulation time of the venous blood found to be depressed as the result of such therapy, nor was any clinical improvement noted that could be attributed to the ovarian therapy.

2. There is no serum or vaccine that will give life immunity from diphtheria, but there is a toxoid (anatoxin-Ramon) that will tend to do so in the majority of cases. The toxoid is far more satisfactory for purposes of immunization than diphtheria toxin-antitoxin.

3. Since Potter reintroduced and popularized the operation of version and extraction, a large number of these operations have been performed. While a few individuals deliver a high proportion of their patients by this maneuver, nearly all obstetricians resort to this operation only for definite obstetric indications. In the type of case cited, occiput posterior, version has become popular in the cases in which the fetal head is not engaged. This popularity is deserved because usually, when the head is high in the pelvis, delivery can be accomplished only by a difficult high or mid forceps delivery. In such cases, version and extraction are preferable. Of course neither a forceps operation nor version and extraction should be attempted if there is a disproportion between the fetal head and the pelvis. In cases of occiput posterior in which the head is engaged, the general practice is to rotate the occiput anteriorly with forceps or manually. De Lee and his associates advocate manual rotation, while Bill is the most prominent authority in favor of instrumental rotation. The same good end results may be obtained with either procedure, provided one makes an accurate diagnosis and uses appropriate care and skill in the delivery. Green soap as a lubricant in the vagina is of valuable assistance. When satisfactory rotation with the hand or instrument proves impossible and especially when the head rests on the perineum, it is preferable to deliver the head as an occiput posterior. However, an extensive episiotomy must be made to prevent a deep laceration. When the head is well engaged, it is not good practice to displace it and perform a version.

COMPLEMENT FIXATION TEST IN TUBERCULOSIS

To the Editor:—Could you discuss through THE JOURNAL the value of the complement fixation test for tuberculosis, both in regard to prognosis and in regard to diagnosis? Kindly omit name and address.

M.D., New York.

ANSWER.—The literature on the complement fixation test in tuberculosis is voluminous. Among the hundreds of articles on this subject there are those which come to the conclusion that the complement fixation test approaches 100 per cent in diagnosis and prognosis. On the other hand, some authors conclude that the test is of but little value either in diagnosis or in prognosis. Between the two extremes are numerous articles giving various evaluations to the test.

The positive test is thought to be dependent on absorption from the lesion, since in the absence of absorption there is no antibody formation. Therefore, before absorption occurs there is no antibody content. The antibody content is usually low when absorption begins but increases with the increase of absorption from the focus and decreases as the focus comes under control and less absorption takes place. Thus, the test may be looked on as one that aids in the determination of the activity of the disease; that is, the positive reaction presents reasonably good evidence that there is some absorption from the lesion, and a negative test indicates that no absorption is taking place.

However, there are some factors that may inhibit the reaction. It is also true that in far advanced terminal cases the antibody curve rapidly falls and the test may become negative. Thus, a tuberculous lesion may exist over a considerable period of time with the complement fixation test negative, owing to the fact that there is little or no absorption. Again, as the lesion is coming under control and absorption ceases, the test becomes negative, yet the lesion is still present and capable of reactivating. In the childhood type of tuberculosis there is little or no absorption in most cases, and the complement fixation test has been found to be of little or no value. Certainly the test is not as final as the Wassermann test in the diagnosis of syphilis.

It is often stated that the complement fixation test in tuberculosis is of greatest value when negative; for example, in the differential diagnosis of chest diseases, such as abscess, bronchiectasis and tumor. In recent years other valuable diagnostic aids, such as the bronchoscope, have been added to the armamentarium. After all, the use of this instrument, and the biopsy that is made possible through it, often gives the final word in diagnosis of nontuberculous chest conditions, which no other means can afford. The complement fixation test is of less value in the diagnosis of tuberculosis in other parts of the body than the lungs, since in these forms of the disease it is not so frequently positive.

In prognosis, particularly among advanced cases of pulmonary tuberculosis, a strongly positive complement fixation test is a better indication than one that reacts weakly. When the test is carefully performed, it is positive in from 60 to 80 per cent of cases of tuberculosis. Obviously, a test that fails in from 20 to 40 per cent cannot be of great value in diagnosis or prognosis. Therefore, although it is used by a number of workers it is of uncertain value, since it does not determine with certainty the clinical activity of all lesions and since it may be negative in very definite cases of tuberculosis and positive in cases with no demonstrable disease. For this reason it is not a test that is depended on much by the clinician, particularly since new diagnostic aids are resulting in less need for such a test. However, considerable research on the complement fixation test is now in progress, and it is possible that refinements in technic or new methods may bring it to a more valuable position than it holds at present.

ECZEMATOID RINGWORM INFECTIONS

To the Editor:—I have a patient, a woman, aged 29, a stenographer, whose hands, especially the palms, and feet are infected by a papular rash with oozing and intense itching. She has been under the treatment of dermatologists for seven months. No results have followed the use of hot permanganate baths, Burow's solution of various ointments. Skin tests and blood examination are negative. Is the diagnosis ringworm, trench foot or chronic eczema? What can be done?

M.D., New Jersey.

ANSWER.—The occurrence of a palmar eruption, with extension to the dorsum of the hands and associated involvement of the feet, as described, is a part of the picture seen in eczematoid ringworm infections. In addition to a "papular rash, with oozing and intense itching," one also notes, in these cases, deep-seated vesicles, scaling and maceration between the toes. In many the hand involvement is a toxic (dermatophytid) eruption, secondary to the involvement of the feet. It is essential that all active infection of the feet be completely cleared if one is to guard against recurrence. The contributory factor of external irritants and sensitivity to certain foods may also play a part in the causation of the eruption. The continuance is suggested of warm compresses of 1:3,000 potassium permanganate solution to the hands and feet, morning and night. After the night compress, the parts should be covered thoroughly with a 3 to 5 per cent crude coal-tar ointment, which should be washed off in the morning with olive oil. After the active infection is controlled, any residual scaling dermatitis may be treated with half-strength Whitfield's ointment, to which may be added from 3 to 5 per cent of precipitated sulphur. A dusting powder may be used between the toes during the day, and the use of an iodine paint to the scaling patches in the morning, such as 3 per cent iodine in benzene. X-rays in fractional doses are a valuable adjunct in treating these cases. One should guard against reinfection by the wearing of white cotton anklets, which should be changed frequently and boiled before wearing again.

DRUGS IN TIC DOULOUREUX

To the Editor:—Please tell me what drugs are most effective in the treatment of tic douloureux? Please omit name if published.

M.D., North Carolina.

ANSWER.—The drug treatment of tic douloureux is notoriously unsatisfactory. Nevertheless, it should be undertaken before injection treatment and surgery are advised. With somewhat of an attempt at causal therapy, one should employ quinine (from 1 to 2 Gm. daily for a considerable time) if malarial, or iodide if syphilitic etiology is suspected, iron and arsenic if there is anemia, sodium salicylate (0.6 Gm. every hour or two for a few days, then three times daily) with sodium bicarbonate if a rheumatic causation might exist, or castor oil (from 15 to 30 cc. daily for several weeks, if intestinal intoxication needs to be excluded). From a standpoint of what might possibly be called alterative therapy, strychnine hypodermic injections (from 2 mg. gradually increasing to 12 mg. daily), cannabis (fluidextract from 0.1 to 0.2 cc. or even more three times daily); or fluidextract of gelsemium (0.05 to 0.2 cc. or more every two to four hours until dizziness, double vision, dilatation of the pupils or dropped lids become manifest) might succeed in changing conditions in the nervous system so as to result in at least temporary improvement. The latest addition to the armamentarium in this condition is trichlorethylene, of which from 20 to 25 drops placed on a piece of gauze should be inhaled three or four times daily for a period of from four to six weeks before being discontinued. During the inhalation the patient should be in a recumbent position, as dizziness or drowsiness may be produced. The use of opiates is strictly contraindicated, as there is greater danger from the habit engendered thereby than there would be from destructive injections into the nerves or surgical evulsion of the nerves.

IRRADIATION OF FEMALE PELVIS

To the Editor:—A Catholic priest, administering to his people in a local Catholic hospital, has asked me for information which he can quote with authority concerning the effect of x-rays and the quantities of x-rays that can be administered to the pelvis especially, and to any other part of the body of a pregnant woman. I will appreciate receiving your answers to these questions, and also references to which this party may refer to back up his interpretations.

M.D., Iowa.

ANSWER.—Regardless of religious belief, irradiation of the pelvis of a pregnant woman or the fertilized egg is a serious procedure and should never be used unless the pregnancy is to be terminated. The results of this procedure are usually retarded cerebral development known as microcephaly. D. P. Murphy (Ovarian Irradiation, *Surg., Gynec. & Obst.* **47**:201 [Aug.] 1928) gives the incidence of defectives as 61.3 per cent following irradiation of pregnant animals. In a later paper (*Surg., Gynec. & Obst.* **48**:766 [June] 1929) the same author reports fifty-three pregnancies in which postconception pelvic radium or roentgen irradiation was administered. Abortion occurred in twenty-three instances (43.4 per cent). Twelve per cent of the thirty full term pregnancies presented some more or less serious disturbance of health or development. These defects in many instances were quite serious and tended to conform somewhat to a type. In summing up his observations in the litters of thirty-four female albino rats irradiated when pregnant Murphy concludes (*Surg., Gynec. & Obst.* **50**:861 [May] 1930) that the deforming of five offspring was due to the radiation, as similar deformities have not been duplicated in a series of 125,000 nonirradiated control animals.

In applying radiation to other parts of the body of a pregnant woman, great care must be exercised to screen the pelvis. If this is carried out, no effect is noticed on the offspring.

Roentgenographic studies of the pregnant pelvis to determine anomalies of the mother or the fetus are not harmful.

ESTROGENIC SUBSTANCES IN BREAST ATROPHY

To the Editor:—A 25 year old white married mother, one year after a normal delivery of her first child, presents herself with a marked atrophy of both breasts. During her early puerperium she had a breast abscess, which necessitated incision and drainage and which interdicted further nursing. Her return menstrual history has been normal in every way. There is now just a slight premenstrual enlargement of both breasts, which begins about seven days before and is maintained throughout the period (five days). Will female sex hormone as obtained in antuitrin-S or that obtained in the ovarian product theelin restore the normal consistency and size of the breasts? Which one is here indicated? It seems peculiar to me that, if there is here an adequate ovarian hormone output as judged from the uterine response and normal menstrual history and therefore behind it all a proper anterior pituitary function, there should nevertheless be such an abnormal mammary response despite the history of breast abscess. Please omit name.

M.D., New York.

ANSWER.—"Female sex hormone" is the name applied by Frank to the estrogenic principle of the ovary. It is not applicable to "antuitrin-S," which is a commercial extract of the anterior pituitary-like gonadotropic principle obtained from the urine of pregnancy. It is preferable for many reasons not to employ the term "female sex hormone" even for theelin; this too is obtained from the urine of pregnancy.

It has been reported that injection or ingestion of estrogenic substance (theelin, theelol, Amniotin and so on) may produce hypertrophy of the breasts. It does not follow from the fact that the patient mentioned has apparently normal menstruation that the normal amount of estrogenic substance is produced by her ovaries; apparently normal bleeding can be induced by amounts of estrogenic principle well below the threshold for the production of normal progestational proliferation of the endometrium. The only way to determine whether adequate amounts are produced is to perform assays on blood

and urine repeatedly during the menstrual cycle, as advocated by Frank. While theoretically the best way to produce mammary enlargement would be to stimulate the ovaries to produce more estrogenic substance, the action of anterior pituitary or anterior pituitary-like principles is not sufficiently controllable to warrant their trial in this case.

Estrogenic substance need not necessarily be injected, as its effects can be obtained by oral administration of rather large doses. It is probable that any effect that may be obtained will not be permanent and that continuous administration of the preparation will be necessary; the disadvantages of this must be kept in mind.

INFECTION OF GLANDS OF THE NECK

To the Editor:—I am writing for some advice regarding a condition that has recently come under my observation. The patient is a woman, aged 21. At the age of 4, a lump was noticed on her neck on the right side anterior to the sternomastoid muscle. This was opened and drained from time to time. The tumor mass shifted over a period of years until it finally came to the midline just over the manubrium. Three years ago it was again incised and drained, and it appeared to heal completely. There was no sign of it to eighteen months, when a small lump appeared just below the lobe of the right ear. It enlarged to the size of an egg, and the patient had great difficulty in opening her jaws. A surgeon incised this mass and curetted out a quantity of cheesy material. The symptoms subsided for about six months, but during the past ten months there has been a constant purulent discharge from an opening one inch anterior to the lobe of the right ear. There have been times when a clear watery fluid flowed out in considerable quantity. This was especially noticeable at meal time. Otherwise the patient appears to be in good health. What would you advise therapeutically?

JOHN A. MOONEY, M.D., Kenton, Ohio.

ANSWER.—The diagnosis probably lies between tuberculosis or a pyogenic infection of the glands of the neck and a branchial cyst. The cysts secrete a sebaceous material and are usually lined by squamous epithelium. They are single and usually lie along the anterior border of the sternocleidomastoid muscle. The center of the cyst is usually about the level of the great cornu of the hyoid.

It is possible that the condition may be a pyogenic or nontuberculous infection of some chronic type, such as syphilis or actinomycosis. The usual laboratory tests should be made to rule these out, including examination of the discharge and blood tests. While the origin is almost certainly in the lymph glands, owing to its change in location and repeated breaking down, it is possible that the salivary glands may be involved.

Systemic tests are not satisfactory for tuberculosis of the glands, but examination and injection into a guinea-pig of the discharge should establish the diagnosis. If these tests are negative, a biopsy should be made and a microscopic examination of the tissue.

The treatment must depend on the condition. Careful search must be made for some focus of infection in the nose and throat, such as infected tonsils and teeth or sinuses. These infections should be eliminated.

General measures are often of value. Locally, roentgen and light treatment may relieve the condition; if not, further surgery may be necessary. But the facial nerve should be avoided.

CHOLECYSTIC DISEASE

To the Editor:—Please let me know whether a diseased gallbladder can spontaneously recover after several years and become a normal gallbladder. My only daughter, aged 21, has suffered a great deal with many pains and because of her illness has virtually become an invalid. In February 1931 a physician roentgenographed her and besides finding a visceroptosis in a gastro-intestinal series saw her gallbladder outlined and warned me of future gallbladder trouble. She had a long double-kinked and movable appendix. In October 1932 Dr. Edward Blaine found a subnormal gallbladder in that its concentrating power was considerably reduced and the distended appearance was compatible with a hydrops. A "low grade gallbladder" was present. In view of the roentgen examination of February 1931, the present examination is distinctly corroborative. Two months ago a good internist made a roentgen examination and diagnosed a normal gallbladder filling and emptying normally. The appendix did not visualize. My daughter is still a sick person and gradually she is becoming more helpless. A splendid local surgeon has not operated for two years but my child is worse. She had spells of epigastric pain and has general depression. M.D., California.

ANSWER.—Although reference is made only to the report of the roentgen examination of the gallbladder in 1931, the patient presumably had attacks of upper abdominal pain simulating biliary tract disease which led to this examination. In the last sentence it is stated, "My child is worse. She had spells of epigastric pain." If it is assumed that these attacks of epigastric pain simulate biliary colic and the patient is becoming worse, abdominal exploration, particularly of the gallbladder, stomach and duodenum, should be carried out. In a problem of diagnosis, the patient's clinical history, her general condition, and the result of the physical examination should be the determining factors in influencing one's decision as to whether or not intra-abdominal disease exists.

In most cases, roentgen examination of the gallbladder is helpful, when positive, as corroborative evidence of cholecystic disease. However, filling and emptying of the gallbladder do not exclude the possibility of cholecystitis or cholelithiasis.

EROSION OF TEETH

To the Editor:—Will you kindly tell me the underlying causes and appropriate treatment of erosion of the teeth occurring at the gum line? I have seen a number of cases in which the enamel is apparently worn off just above the gum line with no evidence of infection or irritation of either gums or teeth. This condition occurs in apparently healthy people who evidently employ sufficient mouth hygiene. I have asked a number of dentists about this condition and have received as many different answers, all of which have been unsatisfactory so far as revealing the cause. Kindly omit name and address. M.D., New York.

ANSWER.—The cause or causes of erosion of the teeth are not fully understood. There is one variety that is produced by the abuse of the teeth in cleaning them through improper use of the brush and the employment of abrasive dentifrices. Another variety is considered to be the effect of secretions either from the parotid or from the mouth mucous glands. Such secretions in persons suffering from this form of erosion are believed to be capable of dissolving enamel and dentin and tend to stagnate in the groove between the gums and the teeth in places opposite the opening for the discharge of the parotid secretion. The former condition is easily managed but the latter, although likely to be associated with fluctuations, does not seem to respond favorably to any known form of treatment. If fillings are placed in the defects, erosion recurs around the filling margins; the use of alkaline preparations is not associated with any considerable degree of improvement, and the effort so far to control the condition by diet or drug therapy has been equally unavailing.

GOLD TRIBROMIDE IN WHOOPING COUGH

To the Editor:—In THE JOURNAL, July 28, I note a question regarding use of gold tribromide for whooping cough. Will you please inform me what preparation is used and the dosage for children? Kindly omit name.

M.D., Iowa.

ANSWER.—Gold tribromide is slowly soluble in water and may be prescribed for very young children in doses of 0.002 Gm. and to larger children in doses of from 0.003 to 0.006 Gm. three times daily, each dose dissolved in a teaspoonful of distilled water. Its virtues are not yet established.

CLIMATE FOR SINUSITIS

To the Editor:—In Queries and Minor Notes in THE JOURNAL, October 13, page 1175, Dr. Henry Wallace of New York, under "Climate and Sinusitis," says "Florida also is not a good place" after finding (in one case) San Diego not agreeable. Let me remark after having lived here in San Diego since 1921, and in Florida twenty years in eye, ear, nose and throat work, that, as in all other things medical, there are patients helped here and patients helped in Arizona, and many in Florida, if the physician knows how to segregate them. Patients in whom drainage is better on rainy days are helped in Florida. Those with much secretion are better in Arizona or Texas, and ordinary patients with neither extreme are better in southern California. Of course I am presuming that all medical and surgical treatment has been given and every assistance besides that of climate first resorted to. It is often a vital matter to patients to change environment, and this should never be done thoughtlessly. I say it unboastingly that few physicians have had the many years of observation in sinus cases that I have had in both Florida and California, and such observation should have some weight. I do agree with Dr. Wallace that all patients should remain in the new environment at least two years for results.

FREDERICK J. WALTER, M.D., San Diego, Calif.

FUNCTION OF THE EPIGLOTTIS IN SPEECH

To the Editor:—In the answers to the question on the function of the epiglottis in Queries and Minor Notes in THE JOURNAL, September 22 and November 3, no mention was made of the conclusions of G. O. Russell (Speech and Voice, New York, Macmillan Company, 1931):

The tip of the epiglottis may lie well back against the wall of the pharynx (p. 175). . . . It assumes characteristic positions in the production of the various vowels (p. 145). The tubercle, cushion or pulvinar of the epiglottis functions as a soft-surfaced filter to lower pitch and mellow the quality in tones when cooperating with the cartilages of Wrisberg (p. 175). When the tonal quality is distinctly nasal, the cushion of the epiglottis is often seen almost to close on the cartilages of Wrisberg (p. 240).

It seems to me that this information would be the most pertinent to the speech teacher.

CHARLES H. VOELKER, Columbus, Ohio.
Professor of Speech Pathology, Capitol College.

Council on Medical Education and Hospitals

COMING EXAMINATIONS

ALABAMA: Montgomery, Jan. 7. Sec., Dr. J. N. Baker, 519 Dexter Ave., Montgomery.

AMERICAN BOARD OF DERMATOLOGY AND SYPHILOLOGY: *Written (Group B candidates).* The examination will be held in various cities throughout the country, April 29. *Oral (Group A and Group B candidates).* New York, June 10. Sec., Dr. C. Guy Lane, 416 Marlborough St., Boston.

AMERICAN BOARD OF OBSTETRICS AND GYNECOLOGY: *Written (Group B candidates).* The examination will be held in various cities of the United States and Canada, March 23. *Final oral and clinical examination (Group A and Group B candidates).* Atlantic City, N. J., June 10-11. Group B application lists close Feb. 23 and Group A application lists close May 10. Sec., Dr. Paul Titus, 1015 Highland Bldg., Pittsburgh.

AMERICAN BOARD OF OPHTHALMOLOGY: Philadelphia, June 10. *Application must be filed at least sixty days prior to date of examination.* Sec., Dr. William H. Wilder, 122 S. Michigan Blvd., Chicago.

AMERICAN BOARD OF OTOLARYNGOLOGY: New York, June 8. Sec., Dr. W. P. Wherry, 1500 Medical Arts Bldg., Omaha.

ARIZONA: *Basic Science.* Tucson, Dec. 18. Sec., Dr. Robert L. Nugent, Science Hall, University of Arizona, Tucson. *Medical.* Phoenix, Jan. 2-3. Sec., Dr. J. H. Patterson, 320 Security Bldg., Phoenix.

COLORADO: Denver, Jan. 18. Sec., Dr. Wm. Whitridge Williams, 422 State Office Bldg., Denver.

DELAWARE: Wilmington, Dec. 11-13. Sec., Dr. Joseph S. McDaniel, Dover.

DISTRICT OF COLUMBIA: *Basic Science.* Washington, Dec. 27-28. *Medical.* Washington, Jan. 14-15. Sec., Commission on Licensure, Dr. W. C. Fowler, 203 District Bldg., Washington.

ILLINOIS: Chicago, Jan. 22-24. Superintendent of Registration, Department of Registration and Education, Mr. Eugene R. Schwartz, Springfield.

IOWA: Des Moines, Jan. 3-5. Dir., Division of Licensure and Registration, Mr. H. W. Grefe, Capitol Bldg., Des Moines.

KANSAS: Topeka, Dec. 11-12. Sec., Dr. C. H. Ewing, Larned.

MARYLAND: *Regular.* Baltimore, Dec. 11-14. Sec., Dr. Henry M. Fitzhugh, 1211 Cathedral St., Baltimore. *Homeopathic.* Baltimore, Dec. 11-12. Sec., Dr. John A. Evans, 612 W. 40th St., Baltimore.

MINNESOTA: *Basic Science.* Minneapolis, Jan. 2-3. Sec., Dr. J. Charnley McKinley, 126 Millard Hall, University of Minnesota, Minneapolis. *Medical.* Minneapolis, Jan. 15-17. Sec., Dr. E. J. Engberg, 350 St. Peter St., St. Paul.

NATIONAL BOARD OF MEDICAL EXAMINERS: *Parts I and II.* The examinations will be held in medical centers where there are five or more candidates, Feb. 13-15. Ex. Sec., Mr. Everett S. Elwood, 225 S. 15th St., Philadelphia.

NEBRASKA: *Basic Science.* Omaha, Jan. 8-9. Dir., Bureau of Examining Boards, Mrs. Clark Perkins, State House, Lincoln.

NEW YORK: Albany, Buffalo, New York and Syracuse, Jan. 28-31. Chief, Professional Examinations Bureau, Mr. Herbert J. Hamilton, Room 315 Education Bldg., Albany.

NORTH DAKOTA: Grand Forks, Jan. 1-4. Sec., Dr. G. M. Williamson, 4½ S. 3d St., Grand Forks.

OKLAHOMA: *Reciprocity.* Oklahoma City, Dec. 11. Sec., Dr. J. M. Byrum, Mammoth Bldg., Shawnee.

OREGON: Portland, Jan. 2-4. Sec., Dr. Joseph F. Wood, 509 Selling Bldg., Portland.

PENNSYLVANIA: Philadelphia, Jan. 8-12. Sec., Board of Medical Education and Licensure, Mr. W. M. Denison, 400 Education Bldg., Harrisburg.

RHODE ISLAND: Providence, Jan. 3-4. Dir., Public Health Commission, Dr. Lester A. Round, 319 State Office Bldg., Providence.

SOUTH DAKOTA: Pierre, Jan. 15-16. Dir., Division of Medical Licensure, Dr. Park B. Jenkins, Pierre.

TENNESSEE: Memphis, Dec. 20-21. Sec., Dr. H. W. Qualls, 130 Madison Ave., Memphis.

VIRGINIA: Richmond, Dec. 12-14. Sec., Dr. J. W. Preston, 28½ Franklin Rd., Roanoke.

WASHINGTON: *Basic Science.* Seattle, Jan. 10-11. *Medical.* Seattle, Jan. 14-16. Dir., Department of Licenses, Mr. Harry C. Huse, Olympia.

WISCONSIN: *Basic Science.* Milwaukee, Dec. 15. Sec., Prof. Robert N. Bauer, 3414 W. Wisconsin Ave., Milwaukee. *Medical.* Madison, Jan. 8-10. Sec., Dr. Robert E. Flynn, 401 Main St., LaCrosse.

THE TRAINING OF PHYSICIANS IN RUSSIA

Decree of the Central Executive Committee, U. S. S. R., Sept. 3, 1934

The following decree, published in *Ekonomicheskaya Zhizn,* Moscow, September 4, has been translated by Peter T. Swanish, Ph.D., of Loyola University, Chicago:

The Central Executive Committee, U. S. S. R., notes that despite the general increase in the number of students in higher institutions of medical education, from 26,100 in 1928 to 48,000 on Jan. 1, 1934, and the growth in the number of such institutions throughout the Soviet Union from twenty-five to forty-nine, the training of physicians, as a consequence of poor administration by the People's Commissars of Health of the Federated Republics, is unsatisfactory.

In the latter connection, the People's Commissars of Health have failed to give sufficient attention to the training of "attending practitioners" of medicine required in urban and rural localities, while at the same time there has been an extraordinary increase in the number of students receiving training in the preventive branches (doctors of hygiene and the like).

Education in the medical schools has not provided a fundamental and general training. The fundamental medical disciplines (normal and pathologic anatomy and physiology, biologic chemistry, clinical subjects) have not been given a sufficiently important place in the curriculum. Students have not been adequately supplied with textbooks despite opportunities for revision of courses and the adoption of improved methods of foreign specialists.

Within recent years, clinics of medical institutions where research in medicine is concentrated have lost their didactic rôle and have become ordinary hospitals; and with respect to equipment and class of patients, their organization does not meet the needs of medical education. Scientific laboratories and lecture halls and anatomy rooms are insufficient in relation to the number of students; laboratory equipment is worn out and has not been adequately maintained or replaced.

For the purpose of eliminating the intolerable conditions that exist in the education of physicians, the committee:

1. Decrees an increase in the number of physicians in the country to provide for better care of urban and village population, the number of students to be admitted to higher institutions of medical training being fixed as follows: 1934, 15,610; 1935, 23,900; 1936, 30,600; 1937, 33,500.

2. Decrees: (*a*) The establishment in all medical institutions in the Soviet Union, for the training of practicing physicians, of faculties in therapeutics, surgery and obstetrics-gynecology in the fifth year of the medical course.

(*b*) The organization of faculties for the training of pediatricians in fourteen higher institutions of medical education.

(*c*) The organization of faculties in sanitation and hygiene, bacteriology-epidemiology and food sanitation, the specialization of physicians in these branches to begin in the fifth year, in ten higher institutions of medical education.

(*d*) A five-year course in all the foregoing institutions and faculties.

3. Decrees the establishment of the following proportions in the distribution of students as between different faculties (in all the republics): general medicine, 75 per cent; pediatrics, 15 per cent; sanitation and hygiene, 10 per cent.

4. Decrees specialization in the various branches of medicine (obstetrics, gynecology, eye, ear, nose and throat, and so on) and the improvement in qualifications of general practitioners, to be carried out as follows:

(*a*) Continuance of status as intern or clinical assistant in approved institutions and hospitals.

(*b*) The pursuit of courses of study in special branches of medicine by physicians attached to urban industry.

(*c*) Compulsory attendance once every three years of lectures and courses in institutions for medical training by all physicians practicing in rural localities and remote settlements, and the payment of stipends covering living costs and the usual compensation of such physicians.

5. (*a*) Decrees and considers as expedient the preparation of practicing physicians of the second grade in evening courses covering a five-year period.

(*b*) Forbids the training of physicians by means of correspondence courses.

6. Instructs the People's Commissars of Health of the Federated Republics to submit by Oct. 1, 1934, a new curriculum and program of study.

7. Decrees the compulsory examination by the state of all students completing courses in higher institutions of medical education. Such examination must be given by special examining boards appointed by the People's Commissars of Health of the Federated Republics.

8. Instructs the People's Commissars of Health of the Federated Republics to supply on time the issue of textbooks for medical schools for the year 1934-1935.

9. Authorizes the appropriation from the state budget, from Jan. 1, 1935, of the necessary financial resources for improving clinical instruction.

10. Authorizes, as of Sept. 1, 1934, additional compensation for senior teaching staffs in clinics for scientific research.

11. Authorizes a more rational and planned use of persons completing medical education and their distribution as between republics, regions and territories of the Soviet Union.

12. Instructs the Soviet of People's Commissars, U. S. S. R., to reexamine the question of additional appropriations for medical education for the year 1934 and for the years 1935-1937.

A. CHERVYAKOV.
A. ENUKIDZE.

President and Secretary, respectively, Central Executive Committee, U. S. S. R.

Colorado July Report

Dr. William Whitridge Williams, secretary, Colorado State Board of Medical Examiners, reports the written examination held in Denver, July 3-6, 1934. The examination covered 8 subjects and included 80 questions. An average of 75 per cent was required to pass. Fifty-four candidates were examined, 53 of whom passed and 1 failed. Twelve physicians were licensed by endorsement. The following schools were represented:

School	PASSED	Year Grad.	Per Cent
College of Medical Evangelists		(1934)	84.4
University of Colorado School of Medicine		(1934)	81.1, 81.4, 82, 83, 83.1, 83.2, 84, 84, 84, 84.1, 84.3, 85, 85, 85, 85.1, 86, 86, 86, 86, 86.3, 86.3, 86.3, 86.4, 87, 87, 87, 87, 87.1, 87.2, 87.2, 87.3, 87.3, 87.3, 89.1, 89.3, 90, 90, 90, 90, 91
Rush Medical College		(1933)	88
Creighton University School of Medicine		(1934)	84.4
University of Nebraska College of Medicine		(1933)	83.5, 86.2
Julius-Maximilians-Universität Medizinische Fakultät, Würzburg, Germany		(1924)*	83.4
Osteopaths †			78.6, 79, 79, 80.6, 84, 86, 88

School	FAILED	Per Cent
Osteopath †		71

School	LICENSED BY ENDORSEMENT	Year Grad.	Endorsement of
Loyola University School of Medicine		(1932)	Illinois
Northwestern Univ. Med. School		(1913)	Illinois, (1929) California
Indiana University School of Medicine		(1930)	Indiana
Hospital College of Medicine, Kentucky		(1904)	Kentucky
Tulane University of Louisiana School of Medicine		(1933)	Louisiana
St. Louis University School of Medicine		(1931)	Missouri
Washington University School of Medicine		(1897)	New Mexico
Columbia Univ. College of Physicians and Surgeons		(1918)	New York
N. Y. Univ., Univ. and Bellevue Hosp. Med. College		(1926)	New York
Western Reserve University School of Medicine		(1932)	Ohio
University of Tennessee College of Medicine		(1933)	Tennessee

* Verification of graduation in process.
† Examined in medicine and surgery.

Indiana June Examination

Dr. William R. Davidson, secretary, Indiana State Board of Medical Registration and Examination, reports the written examination held in Indianapolis, June 19-21, 1934. The examination covered 16 subjects and included 100 questions. An average of 75 per cent was required to pass. One hundred and thirty-nine candidates were examined, 135 of whom passed and 4 failed. The following schools were represented:

School	PASSED	Year Grad.	Per Cent
Georgetown University School of Medicine		(1934)	83
Loyola University School of Medicine		(1933) (1934)	83.7, 79.7, 80.2, 82.7, 85.7*
Northwestern University Medical School		(1934)	80.7, 83.4
Rush Medical College		(1926) (1930)	78, 78.7, (1934) 80.8, 84.2
University of Illinois College of Medicine		(1928) (1931)	83.8, 80.6
Indiana University School of Medicine		(1933)	79.3, 80.8, 84.1, (1934) 76.4, 76.5, 76.6, 76.9, 77.3, 77.5, 77.7, 77.9, 78.7, 79.1, 79.2, 79.3, 79.5, 79.5, 79.5, 79.7, 79.7, 79.8, 79.8, 80, 80, 80.1, 80.1, 80.3, 80.5, 80.6, 80.6, 80.7, 80.7, 80.7, 80.8, 80.8, 80.8, 80.9, 80.9, 80.9, 81, 81, 81, 81, 81.1, 81.2, 81.2, 81.3, 81.3, 81.3, 81.3, 81.3, 81.3, 81.5, 81.5, 81.5, 81.7, 81.7, 81.9, 82, 82.1, 82.1, 82.1, 82.2, 82.2, 82.3, 82.3, 82.3, 82.3, 82.4, 82.5, 82.5, 82.5, 82.6, 82.6, 82.6, 82.7, 82.8, 82.8, 82.8, 82.8, 82.9, 82.9, 82.9, 83.1, 83.3, 83.4, 83.5, 83.7, 83.7, 83.8, 83.8, 83.9, 84, 84.3, 84.5, 84.5, 84.5, 84.6, 84.7, 84.8, 85, 85, 85.1, 85.2, 85.4, 85.5, 85.7, 85.8, 85.9, 86.3, 87.3, 87.9
University of Louisville School of Medicine		(1934)	79.5, 81.4, 84.1
University of Michigan Medical School		(1933)	79.1
Hahnemann Med. College and Hospital of Philadelphia		(1934)	77.4
University of Pennsylvania School of Medicine		(1934)	80.6
Meharry Medical College		(1933)	83.4
University of Wisconsin Medical School		(1932)	79.1
University of Manitoba Faculty of Medicine		(1923)	77.6

School	FAILED	Year Grad.	Number Failed
Rush Medical College		(1919)	1
University of Illinois College of Medicine		(1934)	1
Indiana University School of Medicine		(1934, 2)	2

* This applicant has completed his medical course and will receive his M.D. degree on completion of internship.

Book Notices

Bronchoscopy, Esophagoscopy and Gastroscopy: A Manual of Peroral Endoscopy and Laryngeal Surgery. By Chevalier Jackson, M.D., Sc.D., F.A.C.S., Professor of Bronchoscopy and Esophagoscopy, Temple University, and Chevalier L. Jackson, A.B., M.D., M.Sc., Professor of Clinical Bronchoscopy, Temple University. Third edition. Cloth. Price, $9. Pp. 485, with 240 illustrations. Philadelphia & London: W. B. Saunders Company, 1934.

In this edition, gastroscopy is not only mentioned in the title but more freely discussed in the text. The authors have extended their investigations in this field and with the help of the new Wolf-Schindler flexible gastroscope have brought to light many interesting facts. This instrument at present, unfortunately, is too expensive for the average bronchoscopist. Nevertheless its use, where available, is likely to lead to new observations which may prove of far reaching value to internists and surgeons. This entire chapter is intensely interesting. The new edition is considerably larger than the previous one. Many of the old illustrations have been replaced and new ones added. Also there are several additional colored drawings in the inimitable style of the elder Jackson, all delightfully graphic as usual. The chapters on diseases of the tracheobronchial tree and esophagus are more ample than in the previous edition and include the latest information on the subject. Physical examinations and roentgen studies are again emphasized and gone into thoroughly. The subject of tracheotomy is as complete as one could possibly desire and may be read and reread with profit not only by the surgeon but by interns and nurses as well. Among the topics that have been amplified are the care of chronic tracheal stenosis, the treatment of esophageal diverticula and the repair of tracheal fistulas. From the numerous types of operations suggested in these conditions the authors have selected only those which in their experience have yielded successful results and they have presented them with clarity and brevity. They offer a welcome guide to the perplexed laryngologist who may see these cases only occasionally. All in all, this work is easily the foremost of its kind. Its text is never ambiguous, its illustrations are numerous and appropriate, and its scope is all embracing. Based as it is on vast experience, keen observation and thorough study, it lacks nothing that any endoscopist might require of a textbook.

Human Sterility: Causation, Diagnosis, and Treatment. A Practical Manual of Clinical Procedure. By Samuel Raynor Meaker, M.D., Professor of Gynaecology, Boston University School of Medicine. Medical Aspects of Human Fertility Series Issued by the National Committee on Maternal Health, Inc. Cloth. Price, $4. Pp. 276, with 27 illustrations. Baltimore: Williams & Wilkins Company, 1934.

To those familiar with Meaker's former contributions to the subject of sterility, the present work will indeed be welcome. Published under the auspices of the National Committee on Maternal Health, the book represents a contemporary aspect of the subject presented in a simple, direct and acceptable form. The major portion of it is devoted to the causation and diagnosis of sterility and is described in accordance with the plan adopted by Meaker and his associates for the group study of married couples. Complete outlines are given for study and analysis of causative factors in both partners, and the various steps in procedure are briefly but adequately discussed. The conception that fertility and sterility represent respectively success or failure in human matings is stressed; the results of the union of male and female elements rather than a consideration of the individuals separately is emphasized. The fertility threshold is explained. The last quarter of the book is devoted to treatment, in which a most conservative and highly commendable attitude is adopted. Radical surgical treatment as has been handed down year after year in textbooks on gynecology and urology is completely debunked, and only the most rational procedures are advocated. In regard to endocrine gland treatment, the author has deemed it advisable to mark time, in the light of the present state of knowledge and experience in this field. Thyroid gland therapy alone is advocated in cases warranting its use, carefully controlled by repeated basal metabolic tests. The book will be found to fill a real need in the medical literature and should be widely read by the profession at large. A criticism that may justly be mentioned is a paucity of illustrations, which for the general medical reader are always

desirable and instructive. The limited references to the published literature on the subject of sterility may be justified by the fact that the book is based largely on the author's own clinic experience.

Nephritis and Allied Diseases: Their Pathogeny and Treatment. By Robert Platt, M.D., M.R.C.P., Physician, Royal Infirmary, Sheffield. Cloth. Price, $2.75. Pp. 166, with 8 illustrations. New York & London: Oxford University Press, 1934.

The object of this book is briefly to present, in textbook style, what the author has found of most practical value in existing knowledge of Bright's disease. The book is not intended as a first introduction to the physiology or pathology of the kidney but is rather for the senior student or practitioner, who is assumed to have a certain familiarity with such clinical conditions as edema, high blood pressure and albuminuria and to have seen cases of nephritis in the hospital wards or in private practice.

In line with the modern tendency to simplify rather than to expand the classification of renal disease, the author considers the major types of nephritis under three headings: acute nephritis, subacute nephritis and nephrosis (discussed together), and chronic nephritis. He justifies his discussion of subacute nephritis and nephrosis together on the grounds that the former has all the symptoms and signs found in the latter, with the addition of certain others, and that it is inconceivable that the albuminuria in nephrosis can occur merely as the result of tubular degeneration. He concludes that it is due to an increase in venous pressure. It therefore may be looked on as a variety of subacute nephritis in which some of the clinical signs are minimal or lacking. He admits, however, that distinctions between "subacute nephritis," "nephrosis" and "lipoid nephrosis," if used in a reserved way, are useful and instructive.

Additional chapters are devoted to the structure and function of the kidney; the renal function in disease; the blood and urine in diseases of the kidney, with a brief consideration of tests of renal function; the classification of nephritis; the "pregnancy kidney" and eclampsia; uremia; renal dwarfism and polycystic kidney; essential hypertension and nephrosclerosis; embolism, poisons and surgical disorders as special causes of renal insufficiency; bacterial infections of the kidney (including a few pages on the use of ketogenic diets for bacilluria; he commends this method of treatment, which promises to displace all others in suitable cases); albuminuria without nephritis, and methods of examination of blood and urine.

So far as possible, the author explains the clinical observations and chemical alterations on the basis of the pathologic changes peculiar to the type of disease under discussion. When no conclusive statement can be given, an attempt is made to review briefly the opposing theories. The treatment of each type of nephritis is outlined; this includes diet and its indications and contraindications, and the newer mercurial diuretics. At the end of each chapter of clinical description, a synopsis of three or four representative cases is briefly appended. The bibliography is brief but adequate for the purposes of such a text. While the author expresses some original opinions on the relationship between certain clinical and pathologic features, he has summarized concisely the theses of others and reviewed what the practitioner should know regarding the function of normal and diseased kidneys, in order to treat his patients in the most accepted manner. The result is a useful and acceptable handbook.

Psychopathology: A Survey of Modern Approaches. By J. Ernest Nicole, L.M.S.S.A., D.P.M.R.C.P. & S., Senior Assistant Medical Officer, Lancashire County Mental Hospital, Winwick. With foreword by W. H. B. Stoddart, M.D., B.S., F.R.C.P. Second edition. Cloth. Price, $4.75. Pp. 283. Baltimore: William Wood & Company, 1934.

This book has been well received in its first edition. It is a relatively brief summary of all the schools of modern research and thought that have a bearing on psychopathology. It is intended (1) to be a reference book that will give a survey of the conception and views of the different schools, (2) to show where some of the different lines of thought approximate one another, and (3) to indicate the directions in which further reading might be profitable. It accomplishes its purpose but, to a greater extent than any other book of a similar type, brings together many strange bed fellows. Psychiatric treatment, like surgical treatment, offers various avenues of attack on the various disease processes. Unlike surgery, the operation of choice in psychiatry is seldom clearly indicated, for the evaluation of a pathologic process in a mental disease is seldom made on the same basis by any two psychologists. The present volume reduces all the cults and schools of psychopathology to a dead level. The freudian school, which is growing more and more dominant in this country, is given no more emphasis than Berman's chauvinistic gland theories. Nicole stresses adlerian psychology, which in England has a firmly established place, no more than behaviorism, which, after all, is not a school of psychopathology but merely a technic of studying mental reactions. If, however, one remembers that the scope of this book is vast, one realizes that the author approximates his purpose by including chapters, short it is true, dealing with almost every leading school of psychologic and psychiatric thought of today. The physique theory of Kretschmer, the chemical theories, the social-psychiatric schools of Malinowski and Rivers, the purely psychologic schools of McDougall, Spearman and Watson, are dealt with in order to round out discussions of the work of Jung, Adler and Freud and their disciples. No criticism can be made of the accuracy and validity of Nicole's summaries. To the beginner in psychopathologic work the book may be strongly recommended as a stimulant and guide post for further studies; to the experienced psychiatrist it may reveal some approaches that had not previously been called to his attention.

A Student's Handbook of Clinical Electrocardiography. By William Evans, M.D., M.R.C.P., Assistant Physician and Assistant Director of the Medical Unit, London Hospital. Cloth. Price, 5s. Pp. 49, with 64 illustrations. London: H. K. Lewis & Company, Ltd., 1934.

This small volume consists of a collection of sixty-four electrocardiograms, each being accompanied by a brief explanatory note and a diagnosis. The book is well made, the illustrations are good and the text is simple, but the field for such a volume will be limited, as there are a sufficient number of good works on the subject, several being almost as concise as this one. Its greatest field of usefulness will probably be among interns and those who wish to acquaint themselves merely with interpretation of simple electrocardiograms.

Fases biologicas de la mujer (cartas a Paloma): Pubertad, noviazgo, boda, embarazo, parto, puerperio, crianza, aborto, esterilidad, complejo de maternalidad, procreación consciente, edad crítica, menopausia. Por Francisco Haro. Paper. Price, 5 pesetas. Pp. 230. Madrid: Javier Morata, 1934.

This book is presented in the form of personal letters from the author to an imaginary daughter or young friend and deals with puberty, love, marriage, pregnancy, labor, the puerperium, nursing, abortion, sterility, maternity, the maternal instinct of women, the critical age and the menopause. The object of the book is to present women in any social stratum of life and at any age with a book of consultation and of teachings on the biologic aspects of woman's life.

Modern Advances in Diseases of the Throat. By Arthur Miller, F.R.C.S., D.L.O., Surgeon for Diseases of the Ear, Nose and Throat, French Hospital, London. Cloth. Price, 10/6. Pp. 120, with 43 illustrations. London: H. K. Lewis & Company, Ltd., 1934.

In this booklet the author attempts to summarize current views on some of the important phases of diseases of the throat. Most of the space is taken up with the tonsil question, and Kaiser's material is freely drawn on in this connection. The chapters on anatomy, physiology and bacteriology of the tonsils are rather brief, while those on indications, complications and end results of tonsillectomy are somewhat more comprehensive. Here and there one finds interesting paragraphs on such topics as tonsillectomy in diabetic patients, tonsillectomy in singers and removal of the tonsils by diathermy. The remainder of the book is taken up with a sketchy review of the adenoids and brief discussion of some of the more common inflammatory processes in the throat. On the subject of neoplasms a few pages are devoted to malignant conditions of the tonsils and palate. The book is hardly thorough enough for the specialist but may well be recommended for the general practitioner. The text is clear, the illustrations are adequate and the bibliography is valuable to those who wish for further details.

Medicolegal

Accident Insurance: Typhoid Carrier Not "Totally and Permanently Disabled."—The defendant insurance company issued a policy to the plaintiff, a dairy farmer, which provided certain benefits if he should become totally and permanently disabled, either physically or mentally, from any cause whatever, to such an extent as to render him wholly, continuously and permanently unable to engage in any gainful occupation. While the policy was in force, the state commissioner of health declared the plaintiff to be a typhoid carrier, permanently quarantined him from all connection with the production or sale of milk or of any other food product, and excluded him from his own dairy farm. Because he was a typhoid carrier, the plaintiff could not obtain work. He sought compensation from the insurance company on the ground that he was totally and permanently disabled, the insurance company denied liability, and he sued on the policy. The trial court dismissed the complaint and he appealed to the supreme court, appellate division, fourth department, New York.

The rights of parties to an insurance policy, said the supreme court, must be determined by the policy itself. In construing the total disability provisions of this policy, this court must give effect to what would be ordinary lay interpretation. Can it be said that, when this policy was written, the parties had in mind that a typhoid carrier, affected in no other manner, was physically disabled? Would the ordinary business man in making one of his customary contracts ever consider a typhoid carrier as physically unable to work? A carrier does not have typhoid fever; he is not ill; he simply harbors bacilli and excretes them; his strength is not impaired; his constitution is in no way weakened or undermined; he has the same capacity for labor which he always had; his mental powers are not affected; he suffers no pain or impairment; he would never know that he was a carrier if fecal or urine specimens were not submitted for laboratory examination. His inability to get work is not due to any physical impairment but to the edict of the state, or to fear of infection on the part of others. As the insured concedes in his brief, the carrier state in and of itself, if the carrier's duty to the public and the law of the state be disregarded, would not prevent him from milking cows and handling milk. Physically he is fully able to continue the manual tasks associated with the dairy business. His disability is social in its nature, rather than physical. While it is true that he has found himself unable to earn a livelihood, his inability is not caused by physical impairment of his body, and he is not physically disabled within the meaning of the policy.

The supreme court accordingly affirmed the judgment of the trial court dismissing the plaintiff's complaint.—*Gates v. Prudential Ins. Co. of America (N. Y.), 270 N. Y. S. 282.*

Malpractice: Contemporaneous Tonsillectomy and Extraction of Teeth.—Hughes was suffering from rheumatism and chronic myocarditis. His physician advised the removal of his tonsils and an x-ray examination of his teeth, which examination was made by the defendant Brown, a dentist. The defendant Desmond, a physician, was then called in and advised the removal of the tonsils and the extraction of at least some of the teeth while the patient was under the anesthetic for the tonsillectomy. The defendant physician performed the tonsillectomy, and the defendant dentist extracted some infected teeth, but only sixteen of them, although the patient had insisted on the extraction of all his teeth. The patient died one week later. Contending that it was improper, in view of the patient's condition, to remove the tonsils and so many teeth at one time, his widow sued the defendant-physician and dentist. A verdict was given for the plaintiff and the defendants appealed to the Supreme Court of Colorado.

All that was required of the physician and dentist, said the Supreme Court, in this case, in diagnosing and treating their patient, was such a degree of skill and care as was ordinarily possessed by those in the practice of their respective professions, under similar circumstances and in their particular locality. Whether or not these requirements are met can usually be determined only from the opinions of witnesses learned in the corresponding professions. There is no actionable violation of a duty when only the best judgment, under the circumstances of the case, is required and is used. The burden is on the plaintiff to establish negligence. The evidence here shows that the defendants possessed ordinary and reasonable learning and skill in their professions and that the practice they followed had been successful in similar cases. The plaintiff called several expert witnesses, some of whom said that they would not have pulled more than two or three teeth but the majority of whom testified that such matters were to be left to the best judgment of the operator. The defendants called many experts, who testified, in substance, that operations similar to those performed in this case are advisable under like or similar circumstances and many times are followed with desirable results. Who can say with certainty that the defendants abandoned the field of accepted practice? There must be a clearer case of total abandon than here appears before liability occurs, otherwise the learned judgment of the skilled professions of medicine and dentistry would be lost to the human race.

Further, said the Supreme Court, the burden was on the plaintiff to show that the acts of the defendants were the direct cause of death. No such evidence was produced. The fact that there is a lamentable result does not of itself satisfy that burden imposed on the plaintiff. The burden is not met by showing that death might have resulted from the operation complained of, and it is improper to allow jurors to conjecture as to the efficient and proximate cause. The possibility of death as the result of such operations is not sufficient; there must be evidence eliminating the intervention of other causes which might exist.

For the reasons stated, the judgment in favor of the plaintiff was reversed.—*Brown v. Hughes (Colo.), 30 P. (2d) 259.*

Society Proceedings

COMING MEETINGS

American Academy of Orthopedic Surgeons, New York, Jan. 14-16. Dr. Philip Lewin, 104 South Michigan Boulevard, Chicago, Secretary.

American Association for the Study of Neoplastic Diseases, Dec. 27-29. Dr. Eugene R. Whitmore, 2139 Wyoming Avenue, N.W., Washington, D.C., Secretary.

Puerto Rico, Medical Association of, Santurce, Dec. 14-16. Dr. Julio R. Rolenson, Box 3403, Santurce, Secretary.

Society of American Bacteriologists, Chicago, Dec. 27-29. Dr. James M. Sherman, Cornell University, Ithaca, N. Y., Secretary.

Southern Surgical Association, Sea Island, Ga., Dec. 11-13. Dr. Robert L. Payne, 142 York Street, Norfolk, Va., Secretary.

AMERICAN ASSOCIATION FOR THE STUDY AND CONTROL OF RHEUMATIC DISEASES

Third Conference on Rheumatic Diseases

First Annual Meeting, held at Cleveland, June 11, 1934

(Continued from page 1734)

The Care of the Joints in Chronic Proliferative Arthritis of Children

DRS. FRANK R. OBER and WILLIAM T. GREEN, Boston: In any disease in which the etiology is unknown, the treatment must be symptomatic or directed toward the general or local manifestations of the disease. Proliferative (atrophic) arthritis is no exception to this rule. After the adoption of general measures that improve the health and nutrition of the patient and empirically seem to be helpful, and removal of definite focal infection at least for its general effect, there remains the local care of the joints. In our opinion the latter, the proper care of the joints themselves, is 60 per cent of the therapy in proliferative arthritis of children. The joints should hold one's interest from the very beginning of the disease.

The changes that occur in proliferative arthritis are due not only to the disease directly but also to muscle spasm and

inactivity in a position of deformity. Muscle spasm, nature's way of immobilizing a joint, forces the cartilaginous surfaces together and cannot but increase injury to the joint surfaces. Trauma increases the inflammatory reaction and the spasm of the muscles. Therefore the first principle of therapy in the acute stages of the disease is rest and the avoidance of all trauma; this presupposes freedom from weight bearing and some degree of immobilization. However, motion is necessary even in a normal joint to preserve its integrity. The second consideration, then, in the care of the joints, is the prevention of those changes that are the result of disuse. This implies not only prevention of deformity but performance of active motions, to minimize nutritional changes in the joints and also to decrease atrophy of bones and muscles. The general nourishment of these children is nearly always below par. Some of them look as if they had celiac disease. With a large number there is recession of the lower jaw. A diet high in vitamins is prescribed, including yeast, fresh fruits, green vegetables and meat, with reduction but not elimination of carbohydrates.

The problem, then, is to rest the joints and prevent deformity, eliminate all trauma, control muscle spasm, and yet keep the joints moving. It is of importance to educate the mothers of the patients. The measures found to be most useful in the prevention of deformities include periods of rest and fixation, periods of traction, the use of pulleys that can be managed by the patient himself, periods of exercise in a pool with water at 96 F., special exercises for quadriceps, gluteal and abdominal muscles, and crocheting and other types of occupational therapy.

We should like to emphasize (1) the value of counterpoised motion in allaying muscle spasm and developing motion of the joints in proliferative arthritis of children and (2) the fact that hit or miss physical therapy, with only a vague purpose in mind, is not the solution. These may be helpful, but the primary measures are well planned active exercises, which must be carried out frequently and regularly by some one who spends a great part of the time with the patient, in the usual instance, the mother, who is carefully trained and supervised.

The Management of Atrophic Arthritis

DRS. W. P. HOLBROOK and DONALD F. HILL, Tucson, Ariz.: Insufficient attention has been paid to the variations of management necessary during the different phases of atrophic arthritis. Many good therapeutic aids have not only been used unwisely but often discarded because they were used at the wrong time. The course of atrophic arthritis may vary from a rapidly progressing, febrile and exceedingly severe illness, in which the patient becomes helpless almost immediately, to an afebrile illness with little discomfort over a period of years but which may just as certainly go on to a crippling deformity. Because of these wide variations in onset and course it seems advisable to consider the therapeutic measures in relation to the stage of the disease.

Our conception of atrophic arthritis does not admit a known, single specific etiologic agent, or specific cure. We have previously reported carefully controlled experiments with various types of therapy. These consisted of placing about 400 patients with atrophic arthritis on a program that included diet and bowel management, prevention and correction of deformity, rest, exercise, general physical therapy, and proper climatic conditions. After a control period of several months 100 patients had foci removed, 100 were given blood transfusions, 100 were treated with vaccine, and 100 were given special heliotherapy. Progress was observed over periods ranging from months to years. The results of this study emphasized the nonspecificity of any single therapeutic agent used.

Our present program of treatment includes the following measures: The early establishment of a correct routine of living. This may mean partial or total elimination of business or domestic responsibilities, avoidance of conditions producing nervous strain, and establishment of regular hours. The amount of rest and general activity depends entirely on the severity or phase of the disease process, and the latter should be pushed to tolerance, which may roughly be determined by the presence of increasing fatigue or pain that persists during rest after exercise. The patient may be guided by the rule that pain during exercise is of little or no significance, provided it does not continue after exercise. Proper sedatives are used for nervousness and to insure adequate sleep. Local heat, splints and acetylsalicylic acid are helpful. Corrective exercises, occupational therapy and avoidance of painful postures are indicated. As most patients with atrophic arthritis are undernourished we favor a diet high in calories and vitamins with plenty of red meat, starches, fresh fruits and green vegetables, and the use of yeast, wheat germs and cod liver oil. Belladonna, dilute hydrochloric acid and insulin are sometimes prescribed. When the weight is normal, a diet low in starch and high in vitamins may be used. If obesity is present a diet low in starch and low in fat is prescribed. To regulate elimination, liquid petrolatum, agar, oil-retention enemas and glycerin suppositories generally suffice. High enemas or colonic irrigations are of questionable value.

The various accepted measures for the correction and prevention of deformity must be used as necessary: physical therapy, splints, specific exercise and supports. Before removing foci, we favor a preliminary period of constitutional treatment to avoid acute exacerbations following focal removal. Preoperative transfusions are frequently used, and the removal of foci is generally avoided in the acute phases of the disease. Vaccines have only occasionally proved of undoubted merit. We favor the intravenous use of minute doses of antigen to which the patient is strongly skin sensitive. A series of small blood transfusions often occasions marked relief for patients with acute or subacute arthritis; they seem of little help in chronic afebrile cases.

At the proper time and in proper amounts, heliotherapy may be most useful, and the climatic advantages of Arizona seem definite. It must be understood, however, that without a proper routine of living, arthritis, even on the Tucson desert, can continue as a sad and crippling disease. Too many people come to the Southwest believing that climate performs miracles.

DISCUSSION ON PAPERS OF DRS. SLADEN, ENSIGN AND MC COLL, DRS. OBER AND GREEN, AND DRS. HOLBROOK AND HILL

DR. ROBERT B. OSGOOD, Boston: Attention should be called to the great disparity in the ratio between the 128 cases of hypertrophic arthritis and ten cases of atrophic arthritis of Drs. Sladen, Ensign and McColl. I have been inclined to believe that the influence of diet was greater in the atrophic than in the hypertrophic type, and that the matter of quality was more important than quantity. This study suggests that quantity is imporant, especially the lack of what they properly call "protective foodstuffs," which most physicians speak of as vitamins. A lack of the protective foods in effect constitutes a deficiency diet. What Minot has spoken of as an "optimum diet" is still of great importance in the treatment of chronic arthritis, and most earnest attempts should be made to determine what constitutes such an optimum diet, not for both types or even for one or the other type, but for each individual who is suffering from the disease. It would seem wise not to attempt any rigid standardization of diet but to study the alimentary aberrations of each patient and strive to meet their individual needs of both optimum intake and efficient outgo. Drs. Ober and Green's paper and moving pictures speak for themselves. Prevention of deformity is of supreme importance. This means not just the routine use of physical therapy but the use of measures especially designed and persistently carried out not only to prevent deformity but also to retain and increase joint mobility and improve joint circulation. This is not, I am sorry to say, what physical therapy means to the average physician. Physical therapy is one of the most effective weapons against eventual restriction of function in the atrophic type of arthritis. Of course this presupposes that the generalized disease is being attacked by all other weapons, such as rest, fresh air, sunlight, diet, and the removal of sources of infection. I do not quite agree with Drs. Holbrook and Hill when they say that "regardless of treatment there are recurring periods of exacerbation and remission." I agree that periods of exacerbation and remission often occur in spite of treatment, but not all patients go through these periods, nor is such periodicity regular. When therapy becomes more intelligent, and mental and physical extraneous conditions can be controlled, it will not be necessary to consider such exacerbations as inevitable. In connection with the management of the

bowels, they might well have mentioned abdominal massage after the Drown method and Hugh Owen Thomas's cure for constipation. This consists in making the foot of the bed 6 inches higher than the head, whereby ptosed and kinked intestines crowded into the pelvis may be given more room to function during the night of recumbent relaxation. These mechanical measures I have found to be strong adjuvants in improving alimentation. I agree with the authors' views as to the removal of foci of infection and the employment of vaccines. When the attitude of clinicians in general toward chronic arthritis becomes as sane as that of Drs. Holbrook and Hill, it seems reasonable to hope for fewer tragedies and more successes in the management of the different phases of chronic atrophic arthritis.

The Relation of Dietetics to the Reduction of Tissue Swelling in Arthritis

DRS. C. W. SCULL and RALPH PEMBERTON, Philadelphia: A certain amount of swelling of tissue is an accompaniment of chronic arthritis, and the results of successful therapy include reduction of this swelling as well as of pain and stiffness in joints. This study concerns itself with the influence of diet and postural therapy on such swelling of soft tissues, to be noted especially on the dorsum of the hands. The rapidity with which this swelling is at times reduced suggests that it represents an accumulation of fluid. Since adequate methods for the direct determination of this possibility are not available, the use of indirect methods is necessary; namely, a study of water balance during the interval when swelling is subsiding.

Approximate determinations of water balance indicate that the convalescing arthritic patient experiences a net loss of water from the body. Several factors may be responsible, among them the recumbent position of hospital patients and the effect of diet. On standing, blood becomes concentrated; during recumbency, water is transferred from tissues to the circulating blood. The specific gravity of the venous blood of standing patients averaged 1.028, as compared to 1.026 during recumbency. Such a change is indicative of a transfer of water from tissues to blood in the latter position.

Dehydration and reduction of soft tissue swelling can be demonstrated during the use of submaintenance diets. Calculations indicated to us that tissue catabolism did not account for the amount of water lost, and it was concluded that this loss was of pathologic, not physiologic, fluid. We believe that the benefits frequently resulting from the use of diets low in calories and carbohydrates may thus in part be explained. Such benefits accrue to patients both with atrophic and with hypertrophic arthritis, and the restriction of such therapy to just one type seems at present unwarranted. We believe that disturbances in the distribution of water in tissue may represent a significant pathologic deviation in the rheumatoid syndrome and that the diets used tend to correct such disturbances. The more drastic methods of dehydration, such as by vigorous sweating, purgation and diuresis, have proved of little value and may be dangerous. The more sustained and "physiologic" method of dehydration by suitable diets is preferred.

DISCUSSION

DR. A. ALMON FLETCHER, Toronto: The symptoms of an arthritic patient may change abruptly following a number of events: atmospheric change, removal of foci, use of vaccines and so on. A patient will experience marked stiffness and pain, with increase of swelling noted on arising in the morning. A few hours later he is much better. A varying edema of tissue has been considered a possible cause of morning stiffness. It is interesting to learn that Drs. Pemberton and Scull have noted abrupt improvement, with shifts in water balance and metabolism under the influence of diets low in calories. One must, however, be careful in the application of such observations, as physicians in general are apt to resort to one favorite method of treatment and may be led to use submaintenance diets to the exclusion of other useful therapeutic measures. Patients with arthritis are suffering with a chronic disease due to a variety of factors. All measures calculated to overcome these various factors must be used, and the sentiment of patients and physicians to use one measure, such as a diet, to the exclusion of others, should be combated, for diets alone may be ineffective.

DR. F. J. SLADEN, Detroit: Fearful of the possible harm that might result from the use of starvation periods, such as advocated by Dr. Pemberton as a preliminary measure to further treatment by diet of patients with severe arthritis, I have considered them justified only in relative emergencies, when nothing else has helped. Although I have never understood why, I have had very satisfactory results when I have tried them. I am interested in the explanation suggested now by Drs. Scull and Pemberton. However, I believe there must be a more profound factor at work that hasn't yet been discovered.

DR. RALPH PEMBERTON, Philadelphia: I welcome Dr. Sladen's comment that care must be taken in prescribing submaintenance diets in these cases. There are definite dangers inherent in undernutrition as there are in many of the other measures used for arthritis. Our laboratory work is of an academic nature chiefly, an attempt to study some of the physiologic factors underlying the production and reduction of swelling. I know of no way to explain the presence of this tissue swelling. It may be an inflammatory exudate, although it is difficult for me to interpret it as such.

DR. WALTER BAUER, Boston: From the data presented, one is not justified in drawing any final conclusions concerning the water balance. Not until one actually determines the total acid-base metabolism and insensible perspiration throughout the experimental period can one state with certainty whether there has been an actual loss or gain of water.

DR. C. W. SCULL, Philadelphia: These patients were subjected to a fairly constant regimen, so that there was little likelihood of increasing or changing the sensible loss from day to day. We therefore considered that it represented a constant. We included observations on acid-base balance. We admit that these experiments are somewhat preliminary in nature.

The Peripheral Blood Circulation in Chronic Arthritis and the Influence of Vasodilators

DR. JOSEPH KOVACS, New York: Defective peripheral circulation and disturbed blood supply to affected joints are apparent in many cases of chronic arthritis. Questions arise as to which part of the peripheral circulation (larger arteries, veins, capillaries) is disturbed in chronic arthritis and which disturbances can be considered etiologic factors or merely aggravating agents. Although ligation of arteries to the patella of animals results in changes similar to hypertrophic arthritis, in man the obliteration of major vessels has a more destructive effect on soft tissue and does not produce arthritis, as witness the absence of the latter in endarteritis obliterans. Varicose veins present in many cases of arthritis have an aggravating, not an etiologic, rôle. Phlebitis likewise is a complication, not a cause, of rheumatic infection.

In arthritis, disturbances of peripheral circulation involve chiefly the minute vessels. In cases of atrophic arthritis I found small constricted capillaries in 53 per cent, a slow blood flow in 65 per cent, and a decreased number of capillaries in nailbeds peripheral to joints with definite swellings. In hypertrophic arthritis I found small capillaries in 28 per cent of cases, a slow blood flow in 53 per cent, and decreased number of capillaries near Heberden's nodes. Subnormal skin temperatures were found in 53 per cent of the combined types. Although I am not certain that articular vessels are similarly affected, a similarity in state possibly may be rightly assumed.

The use of vasodilating drugs to increase peripheral circulation, therefore, seems indicated. The oral use of cholin compounds, histamine and nitrites is ineffective, and they produce only brief dilatation when administered subcutaneously. I have studied the effects of iontophoresis, the introduction of drugs through the skin by means of the polar effect of the galvanic (direct) current. Others have found histamine iontophoresis helpful in muscular rheumatism, unsatisfactory in chronic arthritis. Acetylcholine is rapidly destroyed by body fluids and blood. The new compound acetyl-beta-methylcholine chloride (mecholin) is preferable, as it is more potent, more stable and less toxic. The local and general effects of iontophoresis with mecholin have been compared to those with histamine. Locally, mecholin acts mostly on arterioles and produces an increased

skin temperature for from two to eight hours, increased sweating for from four to ten hours, transitory "goose-flesh," an increased oscillometric reading, a faster capillary flow, and a slight increase in the local leukocyte count. I have treated fifty-two patients with chronic arthritis, thirty with the atrophic type and twenty-two with the hypertrophic type. Definite improvement resulted in 90 per cent of the cases of atrophic arthritis, including stubborn cases, and in 80 per cent of those of hypertrophic arthritis. In the latter group, however, similar benefits resulted from other and more usual measures. Reduction of joint swellings and an increased capillary flow were features of the result. Iontophoresis is contraindicated for febrile patients and in the presence of asthma, cardiac disease and advanced senility. Further investigation is needed to determine the amounts of these drugs absorbed during iontophoresis and their mode of action. Experiments indicate that the effects are specific and not simple galvanic effects.

DISCUSSION

DR. PHILIP S. HENCH, Rochester, Minn.: Dr. Kovacs contends that there are significant alterations in capillary blood flow in both atrophic and hypertrophic arthritis, that these alterations may be of etiologic importance, and that most patients are materially improved when these alterations are corrected, at least in part. I agree that arthritis is not primarily associated with occlusive vascular disease of large vessels. I have never seen a related arthritis among a large number of cases of thrombo-angiitis obliterans. In a number of rheumatic diseases, pathologic changes are found in small vessels. In chronic atrophic arthritis, there are often very obvious alterations in general blood flow: low blood pressure, cold clammy extremities, and lowered skin temperature. Dr. Kovacs and others anticipate finding constricted capillaries in the nailbeds of the arthritic patient. At the clinic, Dr. George Brown, Miss Roth and I have studied the capillary flow in a large number of cases of atrophic and hypertrophic arthritis. Like Prusik, we have been unable to find consistent alterations. In many cases the size of the capillaries is unaffected, or slightly dilated, but not constricted. Often, however, flow is slow. Some arthritic patients exhibit vasomotor alterations long before the onset of their joint symptoms. In others they develop fairly early in the course of the disease. Many severe cases exhibit them rather late. The fact remains that the alterations are not consistently present and, during the past five years, while selecting cases suitable for sympathectomy, we have seen many patients with marked, even advanced, arthritis with warm extremities and without changes in capillary size or flow. Dr. Kovacs himself finds changes in only about half the cases of atrophic and in only about a fourth of those of hypertrophic arthritis. It has been an attractive idea that arthritis is the result of "blood hunger," that the changes in joints are secondary to an inadequate supply of blood. One must distinguish between atrophic and hypertrophic arthritis. Recall that when patellar vessels are ligated and the blood supply is sharply diminished, resulting alterations in bone are chiefly hypertrophic, not atrophic. This is what one should expect if one accepts the recent dictum of Jones and Roberts that bone undergoes increased calcification if its blood supply is decreased. However, it undergoes decalcification if its blood supply is increased. If this is true, one might better search for an augmented, not a decreased, blood supply to account for bone atrophy in atrophic arthritis, and indeed such a state has been suggested as being present in the form of hyperemia and the formation of new vessels. Raynaud's disease presents an outstanding example of diminished blood supply from vasospasm. If vasoconstriction is the cause of arthritis, isn't it strange that arthritis occurs in less than 5 per cent of cases of Raynaud's disease? Since vasomotor changes are so inconsistently present in chronic arthritis, early in one, late in another, and not at all in a third, they must represent not the cause of the disease, not even an essential part of the disease, but a complication appearing at varying times and in varying degrees as the sympathetic nervous system is perhaps variously affected by the "toxins" of the disease. As Dr. Kovacs pointed out, an interpretation of alterations in the capillaries of the nail-bed can be made only with consideration of the age grouping. What is needed even more than this is a study of capillaries correlated to the localization, duration and severity of the disease. I have not used iontophoresis and cannot discuss its merits. I am sure that Dr. Kovacs will agree that, while iontophoresis may be effective, the ultimate goal is some method of vasodilatation requiring neither the cutting of the sympathetic nerves nor the use of electric machines beyond the financial province of most patients. The work of Starr, and more recently of Goldsmith, indicates that mecholin given orally in much larger doses than Dr. Kovacs used produces fairly prolonged significant vasodilatation. The effects of such doses should be compared to iontophoresis. When I suggest the desirability of vasodilatation I do not necessarily mean capillary vasodilatation; arteriolar vasodilatation is preferable. They are not the same, and I think that too much stress should not be laid on the significance of capillary constriction or capillary vasodilatation used as an infallible criterion of improvement. Skin temperature is dependent on arteriolar, not capillary, tone. Cold, clammy hands signify arteriolar, not necessarily capillary, constriction. Indeed, the capillaries may be dilated although their flow is sluggish. The size of capillaries is relatively unimportant, as their tone is dependent on the state of arteriolar circulation. Fix the arterioles and the capillaries will take care of themselves, as is demonstrated after sympathectomy when, in the presence of arteriolar dilatation and an improved flow, the capillaries are not more, but less, dilated than before operation.

DR. IRVING S. WRIGHT, New York: One of the most interesting observations is that arthritis rarely occurs in cases of occlusive vascular disease. When the obstruction to blood flow to a part is sudden or gross, arthritis is not produced. Occlusive disease of large vessels is not a causative factor in arthritis. Studies on the size and flow of capillaries lead me to feel that capillary alterations are not the cause of arthritis, although frequently they accompany it. At any rate, from studies of surface capillaries and skin temperature it is impossible to draw definite conclusions as to the condition of articular circulation. Dr. Kovacs' revival of an old method of treatment is worthy of careful consideration, and my observations indicate that the effect of these drugs by means of iontophoresis is more prolonged than by the oral or hypodermic route. Dr. Kovacs has made no claim as to the curative value of mecholin iontophoresis, but if it will relieve pain and discomfort it has a rightful place in therapy. In considering the high percentage of results, one must remember that the psychologic effect of a rather elaborate technic may be very definite. Further time and work will be necessary to determine the permanence of its effects.

DR. D. E. KAUFMAN, St. Louis: I have used mecholin in twenty-three cases of chronic arthritis with benefit to the large joints but none to the small joints, such as those of the fingers and wrists. In six cases the knees have been gratifyingly benefited by treatments three times a week.

DR. JOSEPH KOVACS, New York: I agree with Dr. Hench that the impaired capillary circulation cannot be accounted for as an etiologic factor in chronic arthritis. On the other hand, it has been found, in more than half the cases of arthritis, that there is an impaired capillary circulation aggravating the arthritic condition. Relieving it, one surely benefits the patient. The simplest way of medication is oral administration, I admit, but the simplest method is not in every case the most satisfactory one. The large doses administered by Goldsmith seem to me to be quite expensive therapy. The need for these large doses proves that most of the drug is destroyed in the stomach before it is absorbed, and the part that gets in the circulation causes a mild, general vasodilatation. In arthritis one needs primarily to increase the local circulation of the affected joint or joints, and iontophoresis seems to me the most adequate method for accomplishing this. I usually administer treatment twice a week and have had better results on small joints. It increases, first of all, the circulation of the affected joints and produces only a slight, general reaction. I agree with Dr. Wright that further time and work will be necessary to determine the permanence of acetyl-beta-methylcholine chloride iontophoresis. Dr. Kaufman's observations prove only that there is still a large field unexplored, and much more work must be done before the therapeutic effects of acetyl-beta-methylcholine chloride iontophoresis can be fully evaluated.

(To be continued)

Current Medical Literature

AMERICAN

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Titles marked with an asterisk (*) are abstracted below.

American Heart Journal, St. Louis

10: 1-142 (Oct.) 1934

*Investigation of Patency of Peripheral Arteries. P. Formijne, Amsterdam, the Netherlands.—p. 1.

*Treatment of Chronic Heart Disease by Total Ablation of Thyroid Gland: VII. Heart in Artificial Myxedema. D. Davis, A. A. Weinstein, J. E. F. Riseman and H. L. Blumgart, Boston.—p. 17.

*Determination and Significance of Areas of Ventricular Deflections of Electrocardiogram. F. N. Wilson, A. G. Macleod, P. S. Barker and F. D. Johnston, Ann Arbor, Mich.—p. 46.

Studies in Rheumatic Heart Disease: Analysis of One Hundred and Nineteen Hearts, with Especial Reference to Relationship of Auricular Fibrillation to Mitral Valvular Deformity and Certain Rheumatic Tissue Changes. C. E. de la Chapelle, I. Graef and A. Rottino, New York.—p. 62.

Hearts of Ricksha Pullers: Study of Effect of Chronic Exertion on Cardiovascular System. C. L. Tung, C. K. Hsieh, C. W. Bien and F. R. Dieuaide, Peiping, China.—p. 79.

Patency of So-Called "Anatomically Open But Functionally Closed" Foramen Ovale. P. Gross, Cleveland.—p. 101.

Electrocardiogram of Normal Heart in Pregnancy. L. Feldman and H. H. Hill, Chicago.—p. 110.

Investigation of Patency of Peripheral Arteries.—Formijne describes a method for the registration of arterial oscillations in the fingers and the feet, which is used as a test for the patency of the main arteries. By alternative compression of the radial and ulnar arteries on the hand and of the posterior tibial and dorsal pedal arteries on the feet, the composition of the oscillations can be studied. The so-called occult blood pressure in the fingers and the big toes was studied by the method of Gaertner. The influence of compression of arteries on the occult blood pressure was studied and used for testing the patency of these arteries. A third method, called the shock method, was used for testing the patency of almost totally occluded arteries. Most of these arteries were found to have some degree of patency. The relation between the results of arterial palpation and the compression method was investigated in different groups of patients.

Chronic Heart Disease and Total Ablation of Thyroid.—Davis and his collaborators present observations concerning the rate and character of changes in the size of the heart in thirty-seven patients, and changes in electrocardiographic voltage in thirty-two patients in whom artificial myxedema was produced by total ablation of the normal thyroid. These patients were observed from one and one-half to twelve months after operation. The degree of the hypothyroid state was estimated by measurements of the basal metabolic rate, the velocity of blood flow and the blood cholesterol, and the signs and symptoms of myxedema. Changes in the size of the heart and electrocardiographic voltage were interpreted on the basis of these indexes. After total thyroidectomy, fifteen of twenty-two patients having congestive failure showed an increase of more than 0.5 cm. in the transverse cardiac diameter, three showed no change, and four showed a decrease of more than 0.5 cm. Of eleven patients having angina pectoris, eight showed an increase in the size of the heart and three no change; of four patients with no heart disease, three showed an increase in the size of the heart and one no change. The variations in changes in the size of the heart in the patients who had congestive failure before operation were the result of two opposing factors: the effect of the hypothyroid state tending to increase the size of the heart, and the restoration of circulatory compensation tending to decrease its size. Observations on the changes in the electrocardiographic voltage of P and T waves in thirty-two patients gave the following results: Of twenty patients having congestive failure, fourteen showed a decrease, five no change and one an increase in voltage; of eight patients with angina pectoris, five showed a decrease and three no change in voltage; four patients without heart disease all showed a decrease in voltage. The rate and extent of increase in the size of the heart and of decrease in electrocardiographic voltage of these patients paralleled the development of the hypothyroid state and were a manifestation rather than a secondary consequence of myxedema. These changes generally showed no progression when the metabolism was fixed at a given decreased level by thyroid medication and regressed if the metabolism was raised significantly. In spite of these changes in heart size and electrocardiogram, the patients studied showed a disappearance of signs and symptoms of congestive failure or of angina pectoris with persistence of improvement from three to twelve months and an increased capacity for work as measured by standard exercise tolerance tests. "Myxedema heart" in the sense of a condition aggravating or precipitating attacks of congestive failure or angina pectoris does not develop when hypothyroidism is produced by total ablation of the normal thyroid in patients whose metabolism is maintained at about minus 30 per cent.

Areas of Ventricular Deflections in Electrocardiogram.—Wilson and his associates state that by measuring the areas of the ventricular deflections of the electrocardiogram it is possible to determine the mean electrical axis of QRS, which gives the direction in which the excitatory process spreads over the average element of ventricular muscle, and the mean electrical axis of T, which gives the inverse of the direction in which the recovery process spreads over the average element of ventricular muscle. If all the ventricular muscle passed through the period of excitation at the same time and in the same way, the area of QRS and the area of T would be equal in absolute magnitude but opposite in sign, and the area of QRST would be zero. The area of QRST is a measure of the electrical effects produced by local variations in the excitatory process. The mean electrical axis of QRST gives the direction of the line along which these local variations are greatest. The local variations in the excitatory process that determines the mean electrical axis of QRST are dependent on factors that act on different parts of the ventricular muscle with different intensities. They are not materially influenced by the course of the excitatory process over the ventricular muscle.

American Journal of Diseases of Children, Chicago

48: 713-948 (Oct.) 1934

Study of Teeth of Group of School Children Previously Examined for Rickets. Martha M. Eliot, Susan P. Souther, B. G. Anderson and S. S. Arnim, New Haven, Conn.—p. 713.

Osteomyelitis of Maxilla in Nurslings and in Infants. H. G. Poncher and J. R. Blayney, Chicago.—p. 730.

Tumors of Brain in Infancy: Clinical and Pathologic Study. S. W. Gross, Cleveland.—p. 739.

*Etiology of Mongolism, with Especial Reference to Its Occurrence in Twins. A. J. Rosanoff and Leva M. Handy, Los Angeles.—p. 764.

Thoracic Aortic Aneurysms in Children: Their Relation to Rheumatic Fever. J. K. Calvin and S. J. Nichamin, Chicago.—p. 780.

*Cutaneous Reactions of Children to Pneumococcus and Streptococcus Vaccines. M. de Bruin and A. Vedder, Amsterdam, the Netherlands.—p. 791.

Family Periodic Paralysis: Review of Literature. L. Schoenthal, New York.—p. 799.

*Repeated Sedimentation Tests. L. D. van Antwerp, Meriden, Conn.—p. 814.

Blood Proteins of Children: II. Distribution in Same Specimen of Blood of Hydrolyzable, Amide, Humin, Basic Amino and Mono Amino Nitrogen of Whole Blood, Red Cells and Serum Proteins. A. Bernhard, J. S. Leopold and J. J. Drekter, New York.—p. 819.

Etiology of Mongolism.—Rosanoff and Handy summarize fifty-nine cases of mongolism in twins and report five new cases. In utilizing this material in their study of the etiology of mongolism they find that the etiologic factors are narrowed down to those that must be at work in the germinal or early embryonic period of environment. There is definite statistical correlation between the incidence of mongolism and the age of the parents. An attempt is made here to show, however, that the real etiologic factor is the age of the mother, that of the father having only an indirect bearing by reason of being in statistical correlation with the age of the mother. Similarly the size of the family, the order of birth, "uterine exhaustion," and so on, play no part in the etiology of mon-

golism; they stand out in the statistics only by reason of their correlation with the one real factor: the age of the mother. Mongolism is more common among boys than among girls. This finding is so constant as to force one to assume that, although injury to the ovum is the essential cause of mongolism, the spermatozoon is not without its influence. The X-chromosome in the female-producing spermatozoon seems in some cases to have the power of protecting an injured ovum against its tendency to develop into a mongolian child. It is pointed out in this connection that mongolism varies greatly in the severity of its manifestations and, on the whole, is milder in girls than in boys, possibly owing to partial protection by the additional X-chromosome. All the known facts concerning mongolism seem to point to some condition of the ovary as underlying its pathogenesis. No systematic pathologic investigation of the ovaries of women who have given birth to mongolian idiots has been made, to the authors' knowledge. Coarse or diffuse lesions seem to be excluded as a possible cause. All available evidence seems to justify the speculation that foci of tissue change—perhaps scars—marking the sites of old ovulation are the cause of the trouble.

Cutaneous Reactions to Vaccines.—De Bruin and Vedder observed that infants younger than 3 months react weakly or not at all to intracutaneous injections of vaccines of dead pneumococci and streptococci. Older infants and young children react in a gradually increasing percentage of cases. No type specific or species specific differences between the vaccines were observed. Vaccines of pneumococci and green producing and hemolytic streptococci act the same. The reaction is specific for the group of pneumococci and streptococci. Children who have suffered from bronchitis, lobular pneumonia and other conditions in which pneumococci and streptococci are of etiologic importance often give a positive reaction; other children, a negative reaction. Possibly as a result of such a condition, a negative reaction changes into a positive one. Older children and adults (students) in the majority of cases react positively. Children who have suffered from lobar pneumonia, acute rheumatic fever and chorea almost never react to the vaccines. In persons having suffered from erysipelas the percentage incidence of negative reactions is the same as the chance of recurrence. In erysipelas a positive reaction points to immunity; a negative one indicates that a chance of recurrence exists. In lobar pneumonia and rheumatic fever also some relation exists perhaps between a negative reaction and the incidence of recrudescence. The skin reaction has a significance analogous to the tests of Pirquet and Mantoux.

Repeated Sedimentation Tests.—Van Antwerp points out that the fact that sedimentation rates in children show an unexplained tendency to vary widely without intervening clinical causes should be of value to pediatricians, regardless of the cause. That this occurs commonly is demonstrated by the fact that 27 per cent of his patients gave readings erroneous enough to mislead in their interpretation. His experience, however, shows that a repeated test will usually give the correct reading. Occasionally a repeated test will show a persistently high rate, though this is not common. In such an event, careful clinical search should satisfy one as to the presence or absence of any condition warranting a high rate. A persistently high rate need serve, therefore, only as a warning of the possibility of the presence of a pathologic condition; it need not be held as conclusive. The author performs two sedimentation tests on successive days on all newly admitted patients, the lower rate being taken as the one reflecting the presence or absence of a destructive lesion. He believes that apprehension on the part of the patient is a factor in erroneous results in sedimentation tests, though he has not thus far been able to prove it. If such is the case, it will be necessary to repeat tests on patients giving a high rate, as basal metabolic tests are now repeated. It is already well known that certain types of insanity are characterized by high rates of sedimentation and it is interesting to consider the possibility that the factor influencing the rate in this class of patients may be that of apprehension, because of emotional instability. Later observations comparing blood sugar content with rates of sedimentation will be offered as a factor of proof or disproof of the contention that apprehension influences the rate of sedimentation.

American Journal of Public Health, New York

24: 1005-1098 (Oct.) 1934

Public Health Awaits Social Courage. H. Emerson, New York.—p. 1005.
The Tennessee Valley Authority's New Deal in Health. E. L. Bishop, Knoxville, Tenn.—p. 1023.
Vitamin D Studies, 1933-1934. E. C. McBeath, New York.—p. 1028.
Solution of Streptococcus Carrier Problem. C. W. Bonynge, Los Angeles.—p. 1031.
Approval of Laboratories for Surgical Pathology in New York State. A. Wadsworth and Ruth Gilbert, Albany, N. Y.—p. 1035.
Industrial Hygiene Section 1914-1934. E. R. Hayhurst, Columbus, Ohio.—p. 1039.
Use of Dinitrophenol in Nutritional Disorders: Critical Survey of Clinical Results. M. L. Tainter, W. C. Cutting and A. B. Stockton, San Francisco.—p. 1045.
Concurrent Immunizations. A. B. Ingels, Globe, Ariz.—p. 1054.
Relapsing Fever Problem of California. G. E. Coleman, San Francisco.—p. 1056.
Current Mortality Releases. S. G. Thompson, Jacksonville, Fla.—p. 1065.
Endemic Typhus. J. N. Baker, J. G. McAlpine and D. G. Gill, Montgomery, Ala.—p. 1068.

American Journal of Surgery, New York

26: 1-228 (Oct.) 1934

Status Lymphaticus. D. Symmers, New York.—p. 7.
Pulmonary Embolism Following Surgical Operation. H. E. Robertson, Rochester, Minn.—p. 15.
*Thrombosis of Veins of Lower Extremity and Pulmonary Embolism as Complication of Trauma. B. M. Vance, New York.—p. 19.
Clinical Diagnosis of Fat Embolism. B. M. Vance, New York.—p. 27.
Operation and Trauma as Cause of Coronary and Cerebral Thrombosis. D. A. De Santo, New York.—p. 35.
Wounds by Firearms in Civil Life. T. A. Gonzales, New York.—p. 43.
Unusual Fatal Stab Wounds of Head and Neck with Examples of Unrecognized Ice Pick Wounds of Brain. M. Helpern, New York.—p. 53.
Injuries to Thoracic Duct. S. P. Snedecor, Hackensack, N. J.—p. 64.
Trauma and Malignant Tumors. Leila Charlton Knox, New York.—p. 66.
*Traumatic Peptic Ulcer. G. B. Eusterman and J. G. Mayo, Rochester, Minn.—p. 74.
Trauma and the Aged Patient. J. J. Moorhead, New York.—p. 82.
Characteristic Contact Bruises, Abrasions and Other Injuries in Automobile Accidents. C. G. Berardinelli, Newark, N. J.—p. 88.
*Puerperal Infection, with Especial Reference to Importance of Anatomic Pathways in Spreading of Pyogenic Infection. H. S. Martland, Newark, N. J.—p. 90.
Epidemic of Fatal Estivo-Autumnal Malaria Among Drug Addicts in New York City Transmitted by Common Use of Hypodermic Syringe. M. Helpern, New York.—p. 111.
*Complications Associated with Treatment of Burns. G. C. Penberthy and C. N. Weller, Detroit.—p. 124.
Traumatic Intracranial Hemorrhages. T. Leary, Boston.—p. 133.
So-Called Spontaneous Subarachnoid Hemorrhage: Résumé with Its Medicolegal Consideration. W. D. Ayer, Syracuse, N. Y.—p. 143.
Head Injuries. G. W. Swift, Seattle.—p. 152.
Management of Urologic Complications in Injuries to Spine: Report of Fifty-Four Cases Without Single Infection in Urinary Tract. J. F. Connors and I. E. Nash, New York.—p. 159.
Medicolegal Aspects of Deaths Associated with Chloroform or Ether. A. O. Gettler, New York.—p. 168.
Metallic Poisoning Simulating Acute Surgical Abdomen. R. C. Fisher, New York.—p. 175.
Relation of the Physician to Workmen's Compensation Insurance. E. T. Bell, Minneapolis.—p. 182.
Relationship of Organic Disease to Injury. A. V. St. George, New York.—p. 185.
Roentgenograms as Means of Identification. F. M. Law, New York.—p. 195.
Suggestions for Improving Medicolegal Court Procedure. R. Spillman, New York.—p. 199.
Medical Testimony. J. F. Connor, New York.—p. 204.
Institutes of Legal and Sociologic Medicine: Suggested Program for American Medical Schools. J. Catton, San Francisco.—p. 207.
Asphyxiation: Basic Problem in Medical Education. W. Phillips, New York.—p. 216.

Pulmonary Embolism in Trauma.—Vance discusses the incidence of pulmonary embolism in the traumatic cases and what factors tend to produce the complication. A detailed examination of sixty post-traumatic cases of pulmonary embolism disclosed the following facts: 1. The sex incidence showed that thirty-seven were women and twenty-three men. 2. The age incidence indicated that 50 per cent of the cases occurred between the ages of 40 and 60 years. 3. The types of trauma that injured the patients were the ordinary casualties encountered in any large city. The lesions varied in severity from severe fractures of the pelvis or of the shaft of the femur to mere contusions and abrasions of the extremities. 4. The interval that elapsed between the onset of the trauma and the sudden death by pulmonary embolism varied between four days for

the minimum and fifty-four days for the maximum. 5. When the trauma involved the bones and soft parts of one of the lower extremities, thrombosis was found in the veins of the corresponding lower extremity in thirty-two instances. In fourteen cases of this type a thrombus could not be found. In nine cases, thromboses of the femoral vein were found. A traumatic lesion near the femoral vein or its tributaries has an influence on the production of thrombosis in that vein. In addition, femoral vein thromboses and fatal pulmonary embolism occurred in nontraumatic cases of all sorts, so that the basic etiology of this condition is some factor besides physical injury. 6. Microscopic investigation of the thrombosed veins of the lower extremity, both in the traumatic and in the nontraumatic cases, disclosed that in almost all instances there was a phlebosclerosis, a subacute phlebitis or a periphlebitis of greater or lesser degree. In many cases these lesions probably antedated the trauma. In others the effects of the trauma, whether general or local, probably precipitated the inflammation and produced a nonseptic thrombosis, which resulted eventually in a fatal pulmonary embolism. 7. In seventeen of twenty-one cases which the author examined personally, various acute and chronic disease conditions were present, which may have contributed to the formation of the thrombosis in the veins of the lower extremity.

Traumatic Peptic Ulcer.—Eusterman and Mayo believe that there is apparently adequate evidence to justify the contention that under exceptional circumstances a chronic ulcer of the stomach can have its origin in external, nonpenetrating trauma to the epigastric region. In one case, fairly characteristic symptoms of a hemorrhagic gastric ulcer developed following a severe blow to the left epigastric region. Roentgenoscopy confirmed the presence of a penetrating ulcer near the lesser curvature five months after the injury. Following hospitalization and intensive medical treatment, the lesion disappeared completely and clinical cure resulted. In any case in which a plaintiff claims that a gastric or duodenal ulcer followed external trauma, the physician whose opinion is sought should see that the four postulates of Liniger and Molineus are satisfied. A second cause of ulcer is chronic trauma from within. The commonest form of ulcer of this nature is that secondary to congenital (nontraumatic) diaphragmatic hernia; foreign bodies in the stomach may also cause ulcer. Such secondary lesions are not indurated as a rule and all tend to heal readily following reduction of the hernia or removal of the foreign body.

Puerperal Infection.—Martland believes that the problem of puerperal infection is almost entirely anatomic, depending on anatomic pathways for its spread, on physical and mechanical phenomena of stasis, on drainage and on cellular reactions called forth for defense, and that it has little to do with fancy theories of immunity and selective affinity of certain strains of bacteria for certain tissues. In addition, the condition of septicemia, which denotes only the ability to recognize bacteria in the circulating blood, is in many of these cases intermittent and at times does not exist. In other words, bacteria do not multiply and grow in the blood but are discharged into it from primary, secondary or tertiary depots in the various organs, usually in an intermittent fashion. When they are thrown into the circulating blood, nature makes every effort to rid the blood quickly of their presence through its organs of elimination and filtration. The application of chemotherapy in the intravenous injections of mercurochrome, gentian violet and other like substances is excusable only on the premise of attempting to kill those organisms circulating in the blood at the time of the injections and thus prevent the establishment of secondary foci in other parts of the body. Medication is, then, of no avail; vaccines and serums are equally useless. Only supportive blood transfusions seem to be of any benefit. The more radical the treatment, the higher the mortality. The best results are obtained by those who do the least. While the anatomic view of the subject leads one immediately to the possibility of radical surgery in its eradication, the obvious difficulty in knowing how far the process has extended greatly restricts surgery to the incision and drainage of localized collections of pus and to rare, selected cases in which either the immediate ligation of thrombosed veins or a quick hysterectomy for a uterus containing multiple abscesses might be seriously considered. According to Williams the latter two surgical procedures were in his experience indicated only once in every few years.

Complications in Treatment of Burns.—Penberthy and Weller present eleven cases illustrating the result of what may be considered maltreatment of burn lesions. Each case has been selected to emphasize this factor, as evidenced by the application of improper or incomplete methods of treatment. Attention is called to the long periods of morbidity, the local and general conditions as presented at the time of admission, and the difficulty in obtaining a satisfactory end result by subsequent treatment. The fact that legal procedures have not been instituted is perhaps a matter of good fortune. Strict adherence to the accepted principles of treatment as proposed by Davidson and others will, the authors believe, in the majority of cases prevent the unfortunate occurrence of these all too common complications. Prompt application of local treatment, proper supportive measures, follow-up care and attention, together with the correction of deformities as indicated, offer a reasonable hope for success.

Archives of Dermatology and Syphilology, Chicago

30: 489-610 (Oct.) 1934

Dextrose and Water Content of Normal and of Inflamed Skin. D. M. Pillsbury and G. V. Kulchar, Philadelphia.—p. 489.
Urinary Proteose in Eczema. T. Cornbleet and M. A. Kaplan, Chicago.—p. 497.
Iodide Therapy for Relief of Pain in Ainhum: Report of Case. S. Irgang and E. R. Alexander, New York.—p. 508.
*Ulcus Vulvae Acutum Accompanied by Disease of Skin and Oral Mucosa. J. Z. Talalov, Perm, U. S. S. R.—p. 510.
Dermatitis Produced by Hymolal Salts (New Soaplike Material). C. C. Carpenter, Summit, N. J.—p. 517.
*Tuberculoid Reaction in Lymph Nodes. C. W. Laymon, Minneapolis.—p. 518.
Epidermolysis Bullosa Acquisita: Successful Treatment with Iron Cacodylate, Blood Coagulant, Calcium (with Phosphorus) and Roentgen Rays. H. E. Kittredge, Washington, D. C.—p. 537.
Danlos Syndrome Associated with Congenital Lipomatosis. N. Tobias, St. Louis.—p. 540.
Dermatofibrosis Lenticularis Disseminata and Osteopoikilosis. Helen Ollendorff Curth, New York.—p. 552.
Neurosyphilid of Unna as a Manifestation of Congenital Syphilis: Forme Fruste of Late Cutaneous Syphilis. T. B. Hall and H. Schaerrer, Kansas City, Mo.—p. 561.
Acneform Responses to Patch Tests: Follicular and Papulopustular Reactions to Selectively Pilosebaceous Irritants. Marion B. Sulzberger, New York.—p. 566.

Acute Ulcer of Vulva with Disease of Skin and Oral Mucosa.—Talalov reports two cases of acute ulcer of the vulva associated with lesions on the skin and mucous membrane of the mouth. In the first case, a girl aged 16 suddenly had a chill, fever, pustular and papulopustular lesions on the skin, numerous ulcers typical of acute ulcer of the vulva on the genitalia and perineum, round the anus, in the inguinal creases and in the right axilla, and aphtha-like lesions on the mucosa of the mouth. The smears from the ulcers on the genitalia, in the armpit and in the oral mucosa, as well as the histologic sections of the ulcers from the armpit, showed Bacillus crassus. In the second case, a woman aged 28 had aphthous stomatitis and, in connection with the menses, extremely painful ulcers on the genitalia, one of which persisted for one and one-half years. Histologic investigation in the two cases revealed essentially similar pictures both in the ulcers of the armpit and in those of the genitalia. In both cases the changes were revealed chiefly in the region of blood vessels, round which the infiltrate was concentrated. In the first case the clinical symptoms were caused by the general Bacillus crassus infection, with metastases to the skin and mucous membranes; in the second, acute ulcer of the vulva was accompanied by aphthosis.

Tuberculoid Reaction in Lymph Nodes.—Apparently normal, superficial nodes that were excised from fifty-five patients with carcinomas of the lower lip and breast were studied microscopically by Laymon and compared with regional nodes that were removed from sixteen patients with nonspecific infections and from seventy patients with early untreated syphilis. One inguinal node from a patient with a primary tuberculous ulcer of the ankle and forty-nine nodes from twenty-five patients with fatal visceral tuberculosis were also examined. The author appraises the reports of other investigators and surveys the results of his study. Epithelioid cells in lymph nodes, according to the studies of

Maximow on tissue culture, most likely originate from both reticular cells and lymphocytes. Giant cells, in turn, develop from epithelioid cells by fusion and amitotic division. The tuberculoid reaction does not occur in normal nodes. No section showed evidences of this type of structure. The tuberculoid reaction in the lymph nodes in the group of so-called nonspecific infections is rare. Such histologic structure was not observed in the nodes that were removed from patients with acute pustular dermatitis, furunculosis, pyodermia and similar conditions. Specific tuberculoid structure was illustrated by the observation of microscopic tuberculous lymphadenitis in three of twenty-five patients, who showed no gross manifestations of tuberculosis of the inguinal nodes. The inguinal node from the patient with a primary tuberculous ulcer of the ankle presented a definite tuberculoid structure. The lymphadenitis in early syphilis presented definite tuberculoid structures in approximately 15 to 25 per cent of the cases. In the group of seventy patients, 15.7 per cent were found to have a tuberculoid structure in the nodes. No parallelism between the tuberculoid reaction and the results with luotest or the Mantoux test could be shown. The exact significance of this reaction cannot be proved, owing to the long course of syphilis and the placing of all the patients on an equal basis by chemotherapy. The clinical course of the disease indicates that the tuberculoid reaction is not a manifestation of precocious tertiarism or malignant syphilis. If a direct comparison of the reactivity of lymphoid tissue with that of the skin could be done, the tuberculoid reaction might be considered an index to a higher degree of immunity than was possessed by patients who presented only banal inflammatory changes in the nodes. The tuberculoid reaction in lymph nodes may be considered only as a particular response against an invader and it does not possess the immunologic significance that it has when present in the skin.

Canadian Public Health Journal, Toronto

25: 411-460 (Sept.) 1934

Public Health Progress in Quebec. A. Lessard, Quebec.—p. 411.
The Visiting Nurse Association as a Community Health Asset. R. A. Bolt, Cleveland.—p. 417.
Summary of Results of Treatment in Early Syphilis. E. J. Trow, N. Black and H. H. Elliott, Appendix by Mary A. Ross, Toronto.—p. 422.
Carbon Monoxide Poisoning. H. M. Barrett, Toronto.—p. 430.
Two Years' Experience with Proposed Form for Registration of Stillbirths. P. Parrot, Quebec.—p. 439.
Educational Objective of Public Health Nursing. Marion Lindeburgh, Montreal.—p. 443.

Colorado Medicine, Denver

31: 329-368 (Oct.) 1934

Sewage Disposal: Major Public Health Problem in Colorado. E. N. Chapman, Colorado Springs.—p. 337.
Teaching the Patient to Observe Symptoms of Ovulation. C. W. Anderson, Denver.—p. 344.
Embryonal Carcinoma of Testicle: Report of Two Cases; One Eleven Year Cure. L. E. Likes, Lamar.—p. 349.
Early Syphilis: Diagnosis and Treatment Graphically Represented. H. L. Friedman, Denver.—p. 353.

Florida Medical Association Journal, Jacksonville

21: 135-178 (Oct.) 1934

Roentgenologist as Consultant in Acute Abdominal Conditions. O. O. Feaster, St. Petersburg.—p. 143.
Need for Sanatorium Beds in Control of Tuberculosis. A. S. Anderson, St. Petersburg.—p. 145.
Preoperative and Postoperative Management of Surgical Patients with Mention of Choice of Anesthetic. J. R. Wells, Daytona Beach.—p. 147.
Some Comments Regarding Psychotic. A. T. Cobb, Chattahoochee.—p. 151.

Iowa State Medical Society Journal, Des Moines

24: 507-548 (Oct.) 1934

Medical Clinics: Latent Syphilis as Cause of Heart Disease: Hypertensive Heart Disease. R. W. Scott, Cleveland.—p. 507.
Arteriosclerotic Heart Disease: Relation Between Angina Pectoris and Coronary Occlusion. B. F. Wolverton, Cedar Rapids.—p. 512.
Diagnosis and Treatment of Renal Tuberculosis. L. E. Pierson, Sioux City.—p. 515.
Diagnosis and Clinical Significance of Auricular Fibrillation. L. E. Cooley, Dubuque.—p. 517.
Diagnosis and Treatment of Bronchial Asthma. Julia Cole, Iowa City.—p. 519.
Peptic Ulcer in Children: Case Report. Pauline V. Moore, Solon.—p. 523.

Journal of Bacteriology, Baltimore

28: 323-432 (Oct.) 1934

Basal Medium for Primary Isolation of Pathogens: Quickly Prepared Medium Including Accessory Growth Factors from Fish Roe or Quahaugs. W. E. James, Burlington, Vt.—p. 323.
Evaluation of Some Factors Influencing Phenol Resistance of Staphylococcus Aureus. H. F. Smyth Jr., Philadelphia.—p. 333.
Coagulase and Hemolysin Tests as Measures of Pathogenicity of Staphylococci. G. H. Chapman, C. Berens, Adeline Peters and Lillian Curcio, New York.—p. 343.
Cultivation of Organisms Concerned in Oxidation of Thiosulphate. R. L. Starkey, New Brunswick, N. J.—p. 365.
Production of Polythionates from Thiosulphate by Micro-Organisms. R. L. Starkey, New Brunswick, N. J.—p. 387.
Partial Purification of Yellow Fever Virus Through Adsorption and Elution. T. P. Hughes, New York.—p. 401.
Systematic Study of Micro-Organisms Which Decompose Specific Carbohydrates of Pneumococcus. Grace M. Sickles and Myrtle Shaw, Albany, N. Y.—p. 415.

Journal of Pharmacology & Exper. Therap., Baltimore

52: 121-234 (Oct.) 1934

Studies on Barbiturates: VIII. Distribution of Barbiturates in the Brain. T. Koppanyi, J. M. Dille and S. Krop, Washington, D. C.—p. 121.
Id.: IX. Effect of Barbiturates on Embryo and on Pregnancy. J. M. Dille, Washington, D. C.—p. 129.
Studies in Absorption, Distribution and Elimination of Ethyl Alcohol: I. Quantitative Determination of Ethyl Alcohol in Air, Blood and Urine by Means of Iodine Pentoxide. H. W. Haggard and L. A. Greenberg, New Haven, Conn.—p. 137.
Id.: II. Excretion of Alcohol in Urine and Expired Air; and Distribution of Alcohol Between Air and Water, Blood and Urine. H. W. Haggard and L. A. Greenberg, New Haven, Conn.—p. 150.
Id.: III. Rate of Oxidation of Alcohol in Body. H. W. Haggard and L. A. Greenberg, New Haven, Conn.—p. 167.
Studies on Phytotoxic Index: II. Menstrual Toxin ("Menotoxin"). W. Freeman and J. M. Looney, with technical assistance of Rose R. Small, Worcester, Mass.—p. 179.
Diuretic Effect of Posterior Pituitary Extract in Anesthetized Animal. E. E. Nelson, Ann Arbor, Mich.—p. 184.
*Atropine Tolerance in Infants and Children: Negative Action of Serum of Tolerant Subjects. J. D. Pilcher, Cleveland.—p. 196.
Comparative Actions of Atropine and Its Constituents, *l* and *d* Hyoscyamine, in Infants and Very Young Children. J. D. Pilcher, Cleveland.—p. 206.
Relative Anesthetic Effects of Some Urea Derivatives. E. J. deBeer and A. M. Hjort, Tuckahoe, N. Y.—p. 211.
Relative Anesthetic Effects of Some Aliphatic Ureas. E. J. deBeer, J. S. Buck and A. M. Hjort, Tuckahoe, N. Y.—p. 216.
Studies on Barbiturates: X. Acute Barbital Poisoning in Dehydration and Diuresis. T. Koppanyi, W. S. Murphy and S. Krop, Washington, D. C.—p. 223.
Reabsorption of Water During Pituitary Antidiuresis. I. Gersh, Baltimore.—p. 231.

Atropine Tolerance in Infants.—Pilcher found that the blood serum of several atropine tolerant infants and children did not neutralize the physiologic actions of atropine. But small amounts of atropine could be recovered from the urine of a tolerant subject after larger subcutaneous injections of atropine. Large doses of atropine or its constituents, *l* and *d* hyoscyamine, produced deep sleep in tolerant subjects, with practical absence or slight evidence of the usual signs of atropine action and no preliminary period of excitation such as is commonly seen in atropine poisoning.

Kentucky Medical Journal, Bowling Green

32: 501-558 (Oct.) 1934

Amebiasis: Medical Aspects. M. Flexner, Louisville.—p. 507.
Id.: Surgical Aspects. H. H. Hagan, Louisville.—p. 510.
Id.: Case Reports. H. S. Frazier, Louisville.—p. 513.
Traumatic Surgery of Facial Structures. E. C. Hume, Louisville.—p. 520.
Dentistry: Yesterday, Today and Its Relation to Modern Medicine. J. E. Sullivan, Covington.—p. 522.
Craniopharyngiomas. F. Jelsma, Louisville.—p. 526.
Surgery Under Difficulties. N. M. Garrett, Brodhead.—p. 527.
Proctology in General Practice. W. J. Martin, Louisville.—p. 528.
Fractures of Lower Extremity: Some Newer Considerations. R. A. Griswold and R. O. Joplin, Louisville.—p. 532.
Infectious Diseases as Related to Eye, Ear, Nose and Throat: Prevention and Treatment of Complications of Acute Infectious Diseases as Regards the Ear. W. R. Pryor, Louisville.—p. 541.
Id.: Nasal Complications of Common Infectious Diseases. W. R. Pryor, Louisville.—p. 543.
Id.: Diagnosis: Complications of Common Infectious Diseases in Throat and Carriers of These Infections as Related to Nose and Throat. K. N. Victor, Louisville.—p. 544.
Id.: Ophthalmologic Symptoms and Complications of Common Acute Infectious Diseases of Children. C. D. Townes, Louisville.—p. 547.
Bromoderma: Report of Case Complicated by Pregnancy. A. B. Loveman, Louisville.—p. 553.

Maine Medical Journal, Portland

25: 203-220 (Oct.) 1934

Continuous Drainage in Treatment of Cerebrospinal Infections: Report of Cases. L. H. Smith, Winterport.—p. 205.

Concerning Diagnostic Problems in General Country Practice. F. H. Badger, Winthrop.—p. 210.

Missouri State Medical Assn. Journal, St. Louis

31: 377-412 (Oct.) 1934

Medical Aspects of Thyroidectomy for Organic Heart Disease. J. Jensen, St. Louis.—p. 377.

Thyroidectomy for Organic Heart Disease. D. S. Allen, St. Louis.—p. 379.

Skin Testing in Allergy. H. J. Rinkel, Kansas City.—p. 382.

Allergy in Internal Medicine: Acute Allergic Abdomen: Preliminary Report. L. P. Gay, St. Louis.—p. 385.

High Protein and High Potassium Diet in Treatment of Obesity. H. A. Rusk, St. Louis.—p. 390.

Blood Platelet Count in Postoperative Thrombosis. R. B. H. Gradwohl and S. J. Hiller, St. Louis.—p. 392.

New Jersey Medical Society Journal, Trenton

31: 553-612 (Oct.) 1934

Treatment of Erysipelas in Infants and Children: Based on Series of One Hundred and Sixteen Cases Treated at the Essex County Isolation Hospital During the Past Five Years. K. Blanchard, East Orange, and H. O. Bell, Belleville.—p. 559.

*Prevention of Acne Vulgaris in Adolescent Children. S. Nichols, Asbury Park.—p. 566.

X-Ray Diagnosis of Pneumonia. J. E. Roberts, Camden.—p. 568.

*Prenatal Care and Its Relation to Maternal and Infant Mortality. R. L. DeNormandie, Boston.—p. 570.

The Acute Surgical Abdomen. G. Blackburne, Newark.—p. 577.

Present Day Methods of Treating the Mentally Sick. J. B. Gordon, Marlboro.—p. 581.

Acne Vulgaris in Adolescent Children.—Nichols states that if seen early acne vulgaris and its disfiguring after effects may be controlled in more than 80 per cent of adolescent children. The method that he recommends consists mainly of keeping the skin dry and rather chapped by the use of mild and later stronger soaps and lotio alba of increasing strength and concentration. If the scalp is oily, it should be washed every ten days with castile soap. The face and skin must be made dry looking, with a slightly chapped appearance, and kept that way all the time. The treatment should be continued until at least the age of 15. To keep the skin dry, the face is washed before going to bed with mild castile soap and fairly hot water; then well sopped for five minutes with lotio alba one-fourth strength, allowed to dry on the skin and remain over night, to be washed off in the morning. This treatment should be continued until the skin is dry and rather chapped. If at any time it gets too chapped, the lotio alba should be omitted for three days. As the skin gets used to this treatment, the strength of the soap and lotion should be increased. Patients who have a tendency toward acne are benefited by gradual exposure to the sun or artificial ultraviolet radiation. Foci of infection, constipation, unbalanced diet and general hygiene should receive attention. The author used this method of treatment in forty-seven children between the ages of 8 and 12. In thirty-seven cases, after from three months to four years of treatment, the acne is virtually unnoticeable and well under control. Five cases are much improved and five are moderately improved.

Relation of Antepartum Care to Maternal and Infant Mortality.—DeNormandie suggests that following a minute surgical, clinical, mental and menstrual history a complete physical examination must be made to establish what the patient's condition is at that time. A vaginal examination determines whether microscopic examination of a smear should be made. A speculum examination is most important to discover a marked erosion of the cervix, a possible polyp or rarely an early cancer. A Wassermann test should be made. The hemoglobin should never be omitted, otherwise the anemias of pregnancy cannot be discovered early and proper treatment instituted. The patient's diet, exercise, recreation and rest should be inquired into and supervised. As pregnancy goes on, the visits should be made regularly at least once a month for the first six months and then every three weeks, during the eighth month every two weeks, and the last month once every week or ten days. A creeping up of the diastolic pressure is a most important point to be observed. The urinary examination for albumin and sugar should be done. The weight must be watched carefully. At each visit abdominal palpation and measurement of the fundus should be done and the observations should be recorded. Between the seventh and the eighth month a careful vaginal examination should be made to determine the relation of the size of the baby to the pelvis. By the last month of pregnancy the physician should make up his mind as to the probable method of delivery that will involve the least risk to the mother and the baby. As the patient progresses in her pregnancy, the appearance of bleeding should suggest a placenta praevia until it is definitely proved otherwise. The vaginal examination that is made between the seventh and eight months will in most cases rule out placenta praevia. It will not, however, rule out a low attached placenta. A separated placenta is an emergency. It is often impossible in rural districts for the physician to see his patients as often as necessary, and in such cases the well trained public health nurse, carefully supervised, can be of tremendous help. The author believes that intelligent supervision during pregnancy has a real bearing on the incidence of septicemia as a cause of maternal mortality. Infant mortality will be lowered unquestionably if the cases are carefully studied and the proper method of delivery carried out in each case. A further reason for unsatisfactory antepartum care is that the rank and file of patients have not been educated to the necessity for seeking such care early.

New York State Journal of Medicine, New York

34: 865-898 (Oct. 15) 1934

Carcinoma of Tonsil: Clinical Study of One Hundred and Seventy-Six Cases with Histologic Diagnoses. J. J. Duffy, New York.—p. 865.

Sputum Examinations and the Practicing Physician. R. E. Plunkett and N. S. Lincoln, Albany.—p. 870.

Study of One Thousand Two Hundred and Fifty Basal Metabolisms During Pregnancy: Clinical Presentation of Cases. E. C. Hughes, Syracuse.—p. 873.

Prophylactic Postoperative Roentgenotherapy for Carcinoma of Breast. M. Lenz, Virginia Kneeland Frantz and H. H. Kasabach, New York.—p. 881.

Oklahoma State Medical Assn. Journal, McAlester

27: 349-388 (Oct.) 1934

Crippling from Accidents. W. K. West, Oklahoma City.—p. 349.

Nephrosis in Children. F. S. Etter, Bartlesville.—p. 352.

Treatment of Craniocerebral Injuries. L. Davis, Chicago.—p. 354.

Skin Grafting. J. F. Burton, Oklahoma City.—p. 363.

Transurethral Surgery of the Prostatic Gland. F. C. Gallaher, Shawnee.—p. 367.

Surgery, Gynecology and Obstetrics, Chicago

59: 569-712 (Oct.) 1934

Anatomic and Experimental Observations on Air Embolism. W. H. Chase, Montreal.—p. 569.

Aspiration Biopsy. H. E. Martin and E. B. Ellis, New York.—p. 578.

*Symptom Complex of Complete External Pancreatic Fistula: Report of Case. R. W. Garis and W. C. Merkel, Baltimore.—p. 590.

Value of Estimations of Amylase of Blood in Diagnosis of Suspected Pancreatic Disease: Experimental Study and Review of Literature. J. M. McCaughan, St. Louis.—p. 598.

Preoperative Preparation of Peritoneum in Surgery of Large Intestine. E. L. Young Jr. and G. A. Marks, Boston.—p. 610.

Malignant Disease of Female Generative Organs in First Three Decades of Life. B. F. Schreiner and W. H. Wehr, Buffalo.—p. 616.

*Dial-Urethane for Obstetric Analgesia. P. Brown, Salina, Kan.—p. 622.

Intrathoracic Goiter. F. H. Lahey and N. W. Swinton, Boston.—p. 627.

Interposition of Os Purum in Osteosynthesis After Osteotomy, Resections of Bones and Joints (Interposition-Osteosynthesis). S. Orell, Styrsön, Sweden.—p. 638.

Benign Stricture of Intestine Due to Irradiation of Carcinoma of Cervix Uteri. E. N. Collins and T. E. Jones, Cleveland.—p. 644.

Vascular Disease of Lower Extremities: Review of Amputation Criteria. R. W. McNealy and P. F. Shapiro, Chicago.—p. 650.

*Torsion of Fibromatous Uterus: Surgical Emergency. M. A. McIver and C. L. Buxton, Cooperstown, N. Y.—p. 663.

Cervical Neurofibroma. C. W. Mayo and K. W. Barber, Rochester, Minn.—p. 671.

Toxemias of Pregnancy. W. J. Dieckmann, Chicago.—p. 678.

Complete External Pancreatic Fistula.—Garis and Merkel suggest that complete exclusion of pancreatic juice from the intestine with loss by external fistula produces a highly characteristic clinical syndrome consisting of striking anorexia, nausea, intermittent vomiting, steatorrhea, extreme exhaustion, anhydremia and emaciation, with lethal termination. A clinical example of this symptom complex is presented, corresponding in all important respects with the deleterious and fatal effects of complete pancreatic fistula in experimental animals. The necessity for totality of the fistula in producing the complete

syndrome is stressed, presupposing in every instance a complete obstruction of the duct of Wirsung and an absence or obstruction of accessory duct openings into the intestine; hence the rarity of the condition. It appears that partial or incomplete pancreatic fistula may in certain instances be associated with such symptoms as anorexia, weakness, loss of weight and steatorrhea. Concomitant biliary principle and absence of trypsin or erosive properties in the fistulous fluid may lead readily to errors in diagnosis. The question is raised as to whether the exclusion of pancreatic juice from the intestine in some types of complete obstructive jaundice may not be the major factor in the rapidly fatal outcome, as for example in carcinoma of the ampulla of Vater and carcinoma of the pancreas.

Dial-Urethane for Obstetric Analgesia.—Brown contends that by making the injections of dial-urethane slowly (about 1 cc. per minute) it is possible to adjust the dosage to the individual patient much more accurately than by a fixed volume dose, as used by Nelson. The patient is told that she will feel relaxed and sleepy from the injection; otherwise, alarm may be experienced over the peculiar sensation. The solution, 4 cc., is drawn up into a 5 cc. syringe and the needle is thrust through the wall of the vein. Injection is made slowly, the patient being constantly questioned, and the injection is discontinued when she no longer responds. In some cases 2 cc. of the solution will suffice; in others it may be necessary to inject the full 4 cc. The author has never given more than the latter amount in any single injection. If sound sleep does not occur between pains, a second injection of 2 cc. is given in thirty minutes. Further injections, each of 2 cc., may be given, but he has not exceeded a total of 8 cc. in the course of any labor. He has used the dial-urethane solution in fifty-six cases and he is convinced definitely that, used according to his method, it is the most satisfactory obstetric analgesic that he has ever employed.

Torsion of Fibromatous Uterus.—McIver and Buxton report a case of torsion of a fibromatous uterus occurring in a woman 62 years of age and producing acute symptoms and collapse. Preoperative treatment consisted of transfusion and intravenous dextrose infusions. A supravaginal hysterectomy was performed under local anesthesia, with recovery. Approximately 140 cases have been reported. In considering the pathology it is noted that the tumor responsible for the twist is usually large and may be single or multiple, sessile or pedunculated. The changes taking place in the uterus and fibroid depend on the extent to which the circulation is cut off and vary from edema and congestion to necrosis. The torsion usually takes place at the isthmus; the twist is commonly from left to right and may be through as few as 90 degrees or as many as 450. There are a number of etiologic factors that are not clear, though certain facts may be noted. Before the rotation occurs there is usually a thinning and stretching of the isthmus as the tumor increases in size, so that this structure forms a pedicle, which may be twisted readily. Asymmetry in the growth of the tumor may be a factor in the torsion; movements of the body may be important in initiating the twist. The cases fall into two clinical groups: one giving an acute, fulminating picture similar to that encountered in twists of an ovarian cyst or pedunculated fibroid, the second presenting mild symptoms, which sometimes continue over a period of years. Laparotomy is indicated in the acute group and probably in most of the chronic variety. In the acute group it is desirable that operation be carried out before secondary degenerative changes occur. In collapse, appropriate treatment should be carried out before operation. The type of operation selected depends on the pathologic condition found. Supravaginal hysterectomy is usually indicated, although at times a more conservative procedure, such as myomectomy, is the operation of choice.

Tennessee State Medical Assn. Journal, Nashville

27: 379-424 (Oct.) 1934

Bone Tumors. W. C. Campbell, Memphis.—p. 379.
Intravenous Dextrose Therapy. G. D. Boone, Paris.—p. 388.
Relation of Practicing Physician to Control of Tuberculosis. A. E. Keller, Nashville.—p. 393.
Amebic Dysentery. J. Witherspoon, Nashville.—p. 401.
Aspergillosis. W. R. Smith, Knoxville.—p. 407.

FOREIGN

An asterisk (*) before a title indicates that the article is abstracted below. Single case reports and trials of new drugs are usually omitted.

British Journal of Ophthalmology, London

18: 561-624 (Oct.) 1934

Telangiectatic Granuloma: Botryomycosis. A. Hagedoorn.—p. 561.
Ocular Pemphigus. B. W. Rycroft.—p. 571.
Simultaneous Bilateral Rodent Ulcer of Cornea, Cured by Combined Curetting, Thermocautery and Massive Cyanide Subconjunctival Injection. E. L. Jones.—p. 579.
Primary Erysipelas of Conjunctiva Bulbi: Case. N. I. Shimkin.—p. 583.
X-Ray Treatment of Blepharitis. N. Abu-Saif.—p. 589.

British Journal of Physical Medicine, London

9: 75-96 (Sept.) 1934

New Method of Approach in Certain Respiratory Disorders in Elderly Persons. J. B. Christopherson and Marjorie Broadbent.—p. 77.
Deafness of Advancing Years. G. C. Cathcart.—p. 80.
Importance of Exercises and Recreations for Elderly People. R. K. Brown.—p. 82.
Kidney Disease as Affecting Old Age. J. W. Carr.—p. 85.
Skin Affections of Old Age. S. E. Dore.—p. 87.
Biophysical Treatment in Some Nervous Disorders. F. H. Humphris.—p. 89.

British Journal of Radiology, London

7: 577-640 (Oct.) 1934

Ewing's Bone Sarcoma. R. Stewart-Harrison.—p. 580.
*A Dosage System for Gamma Ray Therapy: Part I and Part II. R. Paterson and H. M. Parker.—p. 592.

Dosage System for Gamma Ray Therapy.—Paterson and Parker describe a practical system of dosage measurement, applicable to all forms of radium therapy other than certain types of interstitial implantation. The international roentgen unit is accepted as a satisfactory unit of quantity of gamma radiation, and the international millicurie hours (Imc. Hr.) of Sievert assessed as equal to 8.4 roentgens. Graphs are submitted showing the amount of radium required for various distances on any applicator to produce a dose of 1,000 roentgens over any desired area. A system of rules is also given, defining how, in the situations encountered in actual clinical practice, radium must be distributed on such applicators to produce a reasonably homogeneous radiation over the whole of a treated surface. The effects of certain dosages of gamma radiation on normal and malignant tissue are described. The lethal dose for squamous epithelioma appears to be 6,000 roentgens delivered as continuous radiation for a period of eight days; normal healthy skin tolerates safely the same dose delivered over a like period and normal mucosa tolerates considerably more than that. The physical and mathematical data on which the system is based are outlined.

British Medical Journal, London

2: 619-664 (Oct. 6) 1934

Use of Narcotics in Treatment of Nervous and Mental Patients. Horder.—p. 619.
Ovarian Conditions as Causes of Pelvic Pain. D. Dougal.—p. 621.
Id. A. H. Davidson.—p. 623.
*Total Thyroidectomy in Treatment of Patients with Congestive Heart Failure and Angina Pectoris. O. Brenner and H. Donovan; anesthetic note by B. L. S. Murtagh.—p. 624.
Traumatic Rupture of Lungs Without Signs of Trauma in Chest Wall. W. E. Cooke.—p. 629.
Morbidity in Family Tree. W. P. Kennedy.—p. 630.
Noise and Health. D. McKenzie.—p. 636.

Thyroidectomy in Congestive Heart Failure and Angina Pectoris.—Brenner and Donovan believe that any measure which promises to prolong in fair comfort the lives of patients with both the congestive and the anginal forms of heart failure, in whom the efficacy of all other forms of treatment has been exhausted, must command serious attention. The removal of the whole thyroid in patients without thyrotoxicosis, incapacitated by congestive or anginal heart failure, is not only comparatively safe but so greatly improves the patients' condition that many of them again become capable of work. They report six cases in which they performed total thyroidectomy. The patients stood the operation well. So far only two patients show signs of slight hypothyroidism. One

of the patients showing the obvious physical signs of hypothyroidism does not show the characteristic mental slowness. Some improvement in the circulatory symptoms occurred in all cases. One patient died of cerebral hemorrhage six weeks after the operation, but it seems improbable that her death was hastened by it. No patient is free from symptoms, but all are capable of more exertion. Some improvement occurred in both the congestive and the anginal symptoms, though previously the patients were steadily regressing in spite of all treatment. The cause of the improvement is not yet entirely beyond doubt. It seems probably that the main factor is the reduced metabolism. Levine pointed out that improvement sometimes occurred when there was no change in the metabolic rate, though the basal metabolic rate usually fell, with further improvement later. This was true in some of the authors' patients. Levine suggests that some of the improvement, especially in patients with angina, is due not to the diminished work of the heart but to humoral changes, particularly an alteration of the reaction of the heart to epinephrine. Though the diminished need of the tissues for blood containing oxygen after thyroidectomy is no doubt the chief factor in the improvement, Blumgart's observations on the velocity of the circulation must not be held to prove this.

East African Medical Journal, Nairobi

11: 177-208 (Sept.) 1934

Evipan-Sodium Anesthesia. J. A. Carman.—p. 178.
Atabrine and Plasmochin in Treatment of Malaria: Note. R. Mackay.—p. 192.
Control of Malaria. O. R. Arnell.—p. 200.

Edinburgh Medical Journal

41: 513-556 (Sept.) 1934

*Association of Adams-Stokes Attacks with Cheyne-Stokes Respiration: Case Report. I. G. W. Hill and A. U. MacKinnon.—p. 513.
Continuous Intravenous Infusion. E. L. Farquharson.—p. 530.

Adams-Stokes Attacks and Cheyne-Stokes Respiration.—Hill and MacKinnon present a case of auriculoventricular block in which the degree of the block varied from complete dissociation to simple prolongation of the PR interval; the ventricular complexes, however, were always typical of bundle-branch block, which varied from time to time in type (right and left). Histologic examination of the main stem of the bundle revealed no lesion. The authors attempt to explain the variations in the ventricular complexes and in the degree of dissociation on the basis of bilateral bundle-branch lesions. Adams-Stokes attacks were associated with disturbances of respiration, analysis of which was made from polygraph tracings of the pulse and respiratory movements. Short asystolic pauses were followed by apneic periods brought about apparently by the returning circulation, and, when Adams-Stokes attacks occurred in rapid succession, a form of Cheyne-Stokes respiration was produced. Longer asystolic periods were associated with a frankly asphyxial behavior of the respiration. The mode of the causation of these respiratory disturbances is discussed.

Journal of Laryngology and Otology, London

49: 557-628 (Sept.) 1934

Nasal Ciliated Epithelium, with Especial Reference to Infection and Treatment. A. W. Proetz.—p. 557.
Action of Cilia and Effect of Drugs on Their Activity. V. E. Negus.—p. 571.
Nasal Flora and Reaction of Nasal Mucus. A. R. Tweedie.—p. 586.

49: 629-708 (Oct.) 1934

*The Otosclerosis Problem: Reports of Two Cases Examined Pathologically. A. A. Gray.—p. 629.
Lipoid Granulomatosis of Bones (Hand-Schüller-Christian Disease). J. S. Fraser.—p. 666.

Otosclerosis.—According to Gray, the essential causative factor of otosclerosis is a gradually increasing defect in the vasomotor mechanism which governs the nutrition of the structures of the organ of hearing as a whole. The axon reflexes are, of course, included in this vasomotor mechanism, and the stimulus which excites the vasomotor mechanism is sound and sound alone. Consequently the vestibular apparatus and the semicircular canals are unaffected. There is no evidence whatever of any defect in any of the endocrine glands or their secretions in otosclerosis. Neither is there any evidence of any defect in the bone metabolism of the body. On the contrary the subjects of otosclerosis are, apart from their deafness, perfectly normal persons with ordinary average health. The deafness of otosclerosis bears little relationship to the extent of the disease in the bone. The deafness may be severe when the stapes is hardly fixed at all. The severity of the tinnitus bears no relationship at all to the extent of the disease in the bone. The extent of the change in the bone bears little relationship to the duration of the disease. The extent of the changes in the bone appears to depend on the age of onset of the disease. The earlier the time at which the otosclerosis begins, the more extensive will the bone lesion become. The deafness of otosclerosis is to a large extent functional and is the result of the insufficient supply of blood to all the nerve structures concerned in the perception of sound. The preponderance of women as subjects of otosclerosis is the result of the greater instability of their vasomotor system and the more frequent disturbances to which it is exposed. The changes in the bone show a remarkable bilateral symmetry, even to minute details. This symmetrical distribution is explained readily by the author's view of the causative factor of otosclerosis. The vasomotor nerves governing the nutrition of the organ of hearing are anatomically symmetrical like other nerve structures in the body. If, therefore, structural changes occur as a result of defective functioning of those nerves, such structural changes will be naturally bilaterally symmetrical in their distribution.

Lancet, London

2: 685-738 (Sept. 29) 1934

The Elderly Primipara. D. M. Stern.—p. 685.
Arterial Hypertension. O. L. V. de Wesselow.—p. 687.
Use of the Diathermy Knife in Malignant Disease of Mouth, Nose and Pharynx with Analysis of One Hundred and Nine Cases. N. Patterson.—p. 694.
Corns and Callosities: Their Diagnostic Value and Treatment. A. T. Fripp and J. K. McConnel.—p. 699.
Serodiagnosis of Syphilis. R. W. Fairbrother and A. L. P. Peeney.—p. 701.
Arterial Embolectomy: Account of Two Cases. F. W. Holdsworth.—p. 703.

2: 739-794 (Oct. 6) 1934

Gee's Disease. T. I. Bennett.—p. 739.
Uveoparotid Tuberculosis. H. G. Garland and J. G. Thomson.—p. 743.
Uveoparotitis Polyneuritica: Report of Case. T. A. L. Davies.—p. 746.
Uveoparotitis. C. B. V. Tait.—p. 748.
Mikulicz Syndrome in Association with Tuberculosis: Report of Case. W. E. Rees.—p. 749.
Borderline of Dental Surgery. R. Kennon.—p. 751.
"White Bile." N. C. Lake, note by J. Patterson.—p. 753.
"Lily Rash:" Occupational Dermatitis: Possible Preventive Treatment. W. H. Palmer, note by J. Freeman.—p. 755.

Medical Journal of Australia, Sydney

2: 337-372 (Sept. 15) 1934

Observations on Friedman Test for Pregnancy. J. M. Buchanan and A. Hyams.—p. 337.
*Cell Reactions in Lymph Nodes Draining Sites of Primary Carcinoma: Preliminary Consideration. A. M. Welsh.—p. 345.
Rheumatoid Arthritis, with Especial Reference to Arthritis Clinic at Royal North Shore Hospital of Sydney. A. L. Ducker.—p. 347.

Cell Reactions in Lymph Nodes Draining Sites of Primary Carcinoma.—Welsh investigated the reactions of the lymph nodes draining the site of a primary carcinoma, the effects on the secondary lymph drainage of the primary carcinoma and the reactions of lymph nodes to stimuli which are not in any way cancerous. In comparing the reactions of the lymph nodes in the three types of lesion it is observed that in all three cases the lymph nodes show increased activity of both types of cell (lymphocyte and reticulo-endothelial). But whereas in the case of pyogenic infection there is an accumulation of polymorphonuclear cells both at the site of the lesion and in the blood and no increase of lymphocytes, in tuberculous and syphilitic lesions there is an increase of lymphocytes both at the site of the lesion and in the blood. In contrast to these two, a primary carcinoma may be found surrounded by lymphocytes, but there is no appreciable increase of lymphocytes in the blood. Nevertheless the activity stimulated in the lymph nodes draining the site of a primary carcinoma is a defensive reaction, though the exact mechanism of this reac-

tion is not known. The endothelial cells lining the sinuses of the lymph nodes become transformed into one form of monocyte and thence into the macrophage. The lymphocytes may also on occasion assume the form of macrophage. The macrophage may eventually take the form of fibroblasts. Therefore it is possible that the macrophages derived from both types of cell within the lymph nodes play some part in forming the fibroblastic defensive reaction at the site of the primary carcinoma, in addition to whatever defensive functions they perform within the lymph node. Lymphoid tissue is one of the most sensitive of normal tissues to radiation, especially when it is in a condition of hyperplasia and proliferation. As the immediate lymph nodes draining the site of a primary carcinoma show the greatest hyperplasia, it suggests that they are the chief source of the natural defense against the invading new growth, not only within their substance but also possibly at the primary lesion. If this is so, one should consider whether prophylactic radiation to these nodes could be applied in such a way as to get the maximal benefit without impairing their natural defensive functions.

Practitioner, London

133: 345-552 (Oct.) 1934

Some Acute Infections of the Autumn. A. H. Douthwaite.—p. 346.
Advances in Treatment of Diseases of Respiratory System. R. A. Young.—p. 356.
Recent Advances in Treatment of Asthma and Hay Fever. G. W. Bray.—p. 368.
Recent Advances in Treatment of Acute Infectious Diseases. W. Gunn.—p. 380.
Recent Advances in Treatment of Tropical Diseases. L. Rogers.—p. 401.
Appendicitis. C. English.—p. 409.
Recent Advances in Treatment of Thyroid Disease. T. Dunhill.—p. 416.
*Recent Advances in Treatment of Blood Diseases. L. J. Witts.—p. 426.
Treatment of High and Low Blood Pressure. C. Hoyle.—p. 434.
Advances in Treatment of Disease in Childhood. R. W. B. Ellis.—p. 445.
Recent Advances in Treatment of Chronic Rheumatism. W. S. C. Copeman.—p. 459.
*Modern Methods of Treatment in Orthopedic Surgery. R. W. Jones.—p. 466.
Advances in Gynecologic Treatment. W. Shaw.—p. 480.
Recent Advances in Treatment of Rectal Diseases. W. B. Gabriel.—p. 489.
Recent Advances in Urologic Treatment. A. E. Roche.—p. 510.
Treatment in Some Minor Surgical Problems. J. B. Hunter.—p. 522.
Recent Advances in Serum Treatment of Disease. G. F. Petrie.—p. 529.
Recent Advances in Vaccine Therapy. A. Fleming.—p. 537.

Advances in Treatment of Blood Diseases.—Witts states that recent advances in the treatment of diseases of the blood have been effected by the introduction of new remedies and also by refinements or greater precision in the use of old remedies. Improvements in therapeutics have to a large extent been the consequence of improvements in diagnosis; e. g., the clinical resemblance between aplastic anemia and hemorrhagic purpura may sometimes be so close that they can be distinguished only by complete examination of the blood. Purpura haemorrhagica is relieved in the most striking manner by splenectomy, an operation that is not only useless but may be harmful in aplastic anemia. Disorders of blood formation are usually highly specific in etiology and response to treatment, and exact diagnosis must precede successful treatment. The author discusses the present place of the following in the treatment of disorders of the blood: iron, copper, x-rays, arsenic, phenylhydrazine, pentnucleotide, transfusions, splenectomy, and liver and stomach preparations.

Modern Methods in Orthopedic Surgery.—Jones points out that one of the most important advances in orthopedics has been the recognition of the inherent power of tissues to deal successfully with infection that is drained adequately. It has been shown that repair is delayed and not accelerated by frequent dressings and by the application of strong antiseptics. Antiseptics may devitalize organisms, but they also destroy healthy young cells, and, if to the tissue destruction of infection is added the tissue destruction of antiseptics, the volume of discharged pus is increased greatly and there is a corresponding increase in the degree of toxic absorption. Moreover, the daily removal of dressings for inspection of the wound is as useless and as harmful as the daily lifting of a bulb for inspection of its growth.

Archives de Médecine des Enfants, Paris

37: 577-640 (Oct.) 1934

*Problem of Cure of Tuberculous Meningitis in Nursling. P. Rueda.—p. 577.

Tuberculous Meningitis in Infants.—Rueda describes several cases of tuberculous meningitis in infants and considers the present state of clinical knowledge of the condition. He concludes that the ordinary hopeless outlook is not justified and that the cases of spontaneous recovery should be a considerable stimulus to the study of therapeutic cure. Careful restudy of the anatomopathologic and clinical processes is necessary, this having been delayed by the accepted but unjustified hopeless outlook. The cure of tuberculous meningitis probably depends on the early diagnosis. Minute study of the cerebrospinal fluid should open new horizons for the favorable modification of the prognosis of tuberculous meningitis. Finally, he believes it necessary to change the manner of considering the results obtained by analysis of the cerebrospinal fluid.

Journal de Chirurgie, Paris

44: 513-672 (Oct.) 1934

Surgery of Suprarenals: Physiologic Bases, Indications and Results. P. Stricker.—p. 513.
*Surgery of Suprarenals: Suprarenalectomy in Obliterative Arteritis. R. Leibovici.—p. 525.
Treatment of Suppurative Arthritis of Knee (Exclusive of War Traumatisms). P. Huet and De Fourmestraux.—p. 537.
*Pathogenesis and Treatment of Proliferating and Stenosing Proctitis. J. Gatellier and A. Weiss.—p. 554.

Suprarenalectomy in Obliterative Arteritis.—Leibovici discusses the various aspects of suprarenalectomy in obliterative arteritis. The physiologic basis is uncertain. Technically there are several methods available, but in any case as much delicacy as in a neurosurgical operation should be used. Histologic examination is necessary to confirm the authenticity of the suprarenalectomy. He concludes that clinically—the only adequate basis at present—the operation does not seem to produce definite, lasting or general vasodilatation. It does not seem to have diminished the percentage of necessary amputations. In general the author feels that the results do not as a rule justify such a radical procedure.

Pathogenesis and Treatment of Proctitis.—The possible causative factors of proctitis are considered in detail by Gatellier and Weiss. They believe that proliferating and stenosing proctitis constitutes one of the clinical manifestations of a much more generalized condition characterized essentially by a lymphatic process capable of invading singly or simultaneously the different lymphatic systems of the perineum. They feel that in the majority of the cases this poradenolymphitis is due to the virus of inguinal lymphogranulomatosis (Nicholas Favre disease). Study of the histories of 139 cases of inflammatory stricture of the rectum treated by different surgical methods and followed for several years demonstrated the failure of these surgical extirpations, since recurrence was practically the rule. When the present theory of pathogenesis is considered, this failure of surgical treatment is not surprising. Palliative and medical treatment, or especially specific treatment of the causal disease, is to be preferred to surgery, but surgical treatment can still be used favorably in the completely inactive cases.

Presse Médicale, Paris

42: 1529-1552 (Oct. 3) 1934

*Physiologic and Pathologic Action of Liver in Diuresis. M. Villaret.—p. 1529.
Maintenance of Position of Fractures of Neck of Femur Without Arthrotomy. P. Brocq and R. Dulot.—p. 1532.
Transillumination in Diagnosis of Breast Tumors. R. Huguenin.—p. 1534.
*Barbituric Arthralgias and Myalgias. P. Castin and P. Gardien.—p. 1536.

Action of Liver in Diuresis.—As a result of experimental physiologic studies on the blocking action of the liver and portal circulation, Villaret concludes that the hepatic portal system plays a dominant part in the mechanical regulation of water exchanges. This regulatory action, instead of being simply passive as in the cases of vascular stasis, for example, with a pyelophlebitis or sclerosis of the liver, is also dependent on an active physiologic mechanism—that of the functioning

of the suprahepatic sphincter system. In the first instance the abnormal increases of volume of the circulating medium initiates the damming action of the liver. The second important part of the liver is a system of protection against heterogenous albumins. The intravenous injection of a liquid into a normal person causes less diuresis than oral administration, because of the reflex blockage caused in the liver by a massive increase in fluid. Practically, these views demonstrate the desirability of the therapeutic production of diuresis by fractional fluid injection in the decubitus position rather than massive fluid intake.

Barbituric Arthralgias and Myalgias.—Castin and Gardien report six cases in which joint or muscle pains developed in the course of barbiturate administration. The painful symptoms were unaccompanied by objective signs except for the discomfort connected with the pain. There were no sensory or vasomotor disturbances or abnormalities of the tendon reflexes of the affected limb. Only one patient showed atrophy of the right deltoid. Only one articulation was usually involved, but it seemed that its functional incapacity was due to the muscles which move it. These pains seemed to occur only after prolonged administration of the drug. No marked sexual distribution is apparent, and the age distribution appears to be simply in proportion to the frequency of use. The authors state that as a general rule the barbituric algesias are no more a contraindication to the use of this drug than are the skin eruptions and other reported complications.

Schweizerische medizinische Wochenschrift, Basel

64: 913-932 (Oct. 6) 1934

*Ischemic Contracture of Fingers Following Fractures of Elbow or Lower Arm in Children. R. Scherb.—p. 913.
*Treatment of Anorexia in Nurslings and Small Children. J. Bernheim-Karrer.—p. 916.
Internal Hemorrhages. R. Meyer-Wildisen.—p. 917.
Two Observations on Accidental Traumatic Genesis of Appendicitis. O. Oesch.—p. 919.
*Bilateral Tubal Pregnancy: Case. W. Stahel.—p. 920.
Autovaccine. R. Freund.—p. 921.
Influenza Epidemic in Zurich in 1933. E. Ganz.—p. 923.
Correct Diathermy in Sciatica. A. Keller and M. J. Purtschert.—p. 927.

Ischemic Contracture of Fingers Following Arm Fractures in Children.—According to Scherb, the ischemic contraction of the fingers develops in the following manner: Shortly after the injury (from six to eight hours), severe pains set in and radiate to the fingers. The hand and the bent fingers are bluish red or blue and edematous, and attempts at passive stretching of the fingers are extremely painful. After about two weeks, pains and the swelling subside, but a clawlike position of the fingers develops which is characteristic for ischemic contracture of the fingers, and, depending on the involvement of the peripheral nerves, sensory and trophic disturbances set in. However, the involvement of the nerves does not necessarily belong to the symptomatology of ischemic contracture, for the contraction is of a myogenous nature, in that the muscle tissue necrotizes as the result of a deficient blood supply and is replaced by cicatricial connective tissue. The opinions about the cause of ischemic contracture are still divided. Some assume that it is the result of the bending of the vessels and nerves on the edge of the fractured piece of bone or of an incarceration of the vessels; that is, of a circulatory disturbance at the site of the fracture. The author does not accept this theory but advances evidence indicating that ischemic contracture of the fingers is caused by the subfascial hematoma. The origin of the hematoma makes it understandable why only the flexor muscles of the lower arm become involved. The bandage is not responsible for the contracture, for if this were the case the extensor muscles would likewise become involved. The author thinks that, if the first symptoms of ischemic contracture are observed early, a lengthwise divison of the fascia of the lower arm should be done in order to relieve the pressure of the hematoma on the threatened muscles. As treatment he recommends that stretching of the contracted flexors of the fingers should always be tried by conservative measures and states that only slow progress can be expected. If in case of a supracondylar fracture the flexors are completely destroyed, a substitute could eventually be produced by tendon transplantation.

Treatment of Anorexia in Children.—Bernheim-Karrer emphasizes that gastric disturbances are not given sufficient attention in the treatment of anorexia of small children. He thinks this the result of gastrogenic anorexia being frequently confused with neurogenic anorexia. A gastrogenic anorexia may become superimposed on a neurogenic form. Retardation in the evacuation of the stomach alone may lead to loss of appetite. He describes several cases of nurslings and small children. In nervous anorexia the tongue is usually clear; it was coated in the reported cases. Whenever the tongue is coated, a purely nervous origin of the anorexia must be doubted and it is advisable to examine the contents of the stomach. In nervous anorexia the examination of the stomach usually gives negative results or reveals only a slight motor insufficiency or hyperacidity and hypotonia. However, if gastritis exists, there are usually considerable digestive residues. In case of a pronounced hyperacidity, the administration of sodium bicarbonate is helpful. The gastric catarrh may be counteracted by irrigations with Vichy water, but care should be taken that the pressure is not too high, for this would increase the already existing hypotonia of the stomach. In one of the children the anamnesis revealed that the mother and grandmother had had gastric diseases and it is possible that here an organic deficiency was involved. The author stresses as the most important point the efficacy of gastric irrigations.

Bilateral Tubal Pregnancy.—Stahel reports the case of a woman, aged 36. Severe pains in the right hypogastrium with vomiting and constipation led to the diagnosis of appendicitis, but at first the patient did not consent to an operation. A sudden recurrence of the severe pains was diagnosed as perforation of the inflamed appendix or perhaps ruptured tubal pregnancy. The discharge of blood from the vagina and another examination led to the diagnosis of ruptured tubal pregnancy of the right side, and an operation was done at once. A tumor, the size of an apple, which ruptured when it was dislocated, was detected on the right side of the uterus, and the opening discharged blood, a fetus 5 cm. in length, and placental tissue. The right tube and ovary were removed but, in spite of careful hemostasis, bleeding continued. Further examination of the pelvic organs revealed that the left tube was torn, discharged blood and contained a fetus of approximately the same length as the right tube. The left tube was likewise removed but the ovary was left intact. Microscopic examination disclosed a bilateral chronic salpingitis and it may be assumed that this was the cause of the tubal pregnancy. It is possible that this salpingitis in turn was caused by an old gonorrheal infection. Since the two fetuses were approximately of the same size, it is probable that two ova were fertilized simultaneously. The woman recovered in a comparatively short time.

Clinica Medica Italiana, Milan

65: 913-1012 (Oct.) 1934

Carcinosis of Skeleton Probably Due to Latent Pulmonary Neoplasia. G. Ferrari and G. E. Dolfini.—p. 915.
*Size of Erythrocytes with Granulofilamentous Reaction in Relation to Physiologic and Pathologic Anisocytosis. G. Angelini.—p. 945.
*Oxalemia and Oxaluria in Alterations of System Regulating Glycogen Metabolism. G. Battistini.—p. 971.
Research on Venous Pressure of Limb Subjected to Pressure. G. Martini.—p. 982.
Subarachnoid Hemorrhages. M. Dalla Palma.—p. 990.

The Size of Erythrocytes.—Angelini studied the size of the reticulocytes and the erythrocytes in normal conditions and in various diseases of the liver. He maintains that anisocytosis may be observed in the early stages of the erythrocyte formation (reticulocytes) in a manner corresponding to the anisocytosis commonly expressed by the erythrocytometric formula. The existence of this anisocytosis of immature cells must be kept in mind in interpreting anisocytosis in general. The reticulocytes offer a formula of larger measurements than the constituents of the general erythrocytometric formula; the smaller elements in the latter formula are not found in the reticulocytes, nor can it be stated that they are even young elements. The variety of the size of the erythrocytes must not be considered merely as an expression of the different phases of their life cycle (large young erythrocytes, small old erythrocytes). There is a sound basis for believing that in the course of their existence the erythrocytes, like other cells, undergo a

reduction in size. Only the extreme examples may be considered products of new formation (maximal erythrocytes) or on the other hand of senescence (minimal erythrocytes). In determining the size of the others, the author advises caution, especially in anisomicrocytosis (hemolytic anemia, infantile splenic anemia and pernicious anemia), in which relatively small forms are also found among the reticulocytes. A similar reduction is missing only in some cases of cirrhosis of the liver with a macrocytic appearance, in which the formula of the reticulocytes coincides with that of the erythrocytes in general.

Oxalemia and Oxaluria in Alterations of System Regulating Glycogen Metabolism.—Battistini determined the oxalic rate of the blood and the urine in various changes of the system regulating glycogen metabolism. All of twenty-four diabetic patients examined presented hyperoxalemia and hyperoxaluria, and the values amounted to two and three times the normal rate. The rate of oxalemia and oxaluria was higher in cases of so-called fat diabetes and less marked in forms of diabetes complicated by acidosis. The oxalemic curve after ingestion of dextrose remained elevated beyond the third hour. By eliminating the carbohydrates from the diet of patients presenting slight forms of diabetes and by administering insulin to patients presenting grave diabetic conditions, the author obtained a lowering of the oxalic rate of the blood and urine. He encountered a marked hyperoxalemia and a slight hyperglycemia in eight cases of atrophic cirrhosis in an advanced stage, in one case of syphilitic hepatitis and in one case of carcinoma of the liver. In these hepatic alterations, after administration of dextrose, the oxalemic curve remained elevated beyond the third hour as in the glycemic curve. The author states in conclusion that the oxalic metabolism is intimately connected with the carbohydrate metabolism, of which it is an intermediate product.

Semana Médica, Buenos Aires

41: 929-1000 (Sept. 27) 1934. Partial Index

The Two Puericultures. N. Palacios Costa and F. Escardó.—p. 929.
Dangers of Diathermic Needle. A. J. Manes.—p. 934.
*Spontaneous Pneumoperitoneum in Perforation of Gastric and Duodenal Ulcers. A. Fernández Saralegui and G. Belleville.—p. 936.
Sclerotic-Atrophic Encephalitis (Diffuse Sclerosis): Case. R. Carrillo.—p. 938.
Paracoccidiodal Granuloma of Pancreatic Localization: Case. R. Marengo, E. A. Caldas and J. M. Raffo.—p. 975.
*Postoperative Intravenous Injections of Sodium Chloride. H. D. Berri.—p. 979.
Fractures of Upper Epiphysis of Humerus. W. Tejerina Fotheringham.—p. 981.

Pneumoperitoneum in Perforation of Gastric and Duodenal Ulcers.—Fernández Saralegui and Belleville emphasize the importance of the roentgen examination of the abdomen in acute abdominal conditions in patients with a positive Jobert's sign (disappearance of the hepatic dulness on percussion in the liver area). The sign indicates the presence of spontaneous pneumoperitoneum, the typical syndrome of perforation of a hollow viscus, and its roentgen verification indicates the emergency of an immediate surgical intervention on the patient. The chamber of air in spontaneous pneumoperitoneum following gastric or duodenal perforation shows itself in the roentgen picture as a limited semilunar space of uniform transparency, located between the diaphragm and the convex aspect of the liver, in the upper part of the subphrenic space. The roentgenogram of spontaneous pneumoperitoneum by ulcer perforation may be differentiated from similar roentgenograms, such as those given by spontaneous pneumothorax of the base of the lung and by pyogaseous subphrenic abscess and gaseous peritonitis, by the physical, functional, local and general symptoms, and from the roentgenogram of hepatodiaphragmatic interposition of the colon (Kausch's internal tympanism) by the diffential roentgen characteristics of the latter, as described by Chilaiditi. Two cases of spontaneous pneumoperitoneum by perforation of ulcers of the anterior aspect of the pylorus, with atypical and classic clinical pictures, respectively, are reported. In both cases the results of the roentgen examination of the abdomen that confirmed the diagnosis of pneumoperitoneum, based on the presence of a positive Jobert's sign, were the basis for the decision to perform an immediate operation, which saved the life of the patients.

Postoperative Intravenous Injections of Sodium Chloride.—Berri confirms Robineau and Lévy's statements on the prophylactic value of the injections of hypertonic salt solution for the prevention of accidents accompanied by hyperazotemia and hypochloremia, as appeared in the *Presse médicale* **81**:1565 (Oct. 11) 1933 (abstr. THE JOURNAL, Dec. 2, 1933, p. 1836). The technic is as follows: A subcutaneous injection of 500 cc. of isotonic dextrose solution is given to the patient in the course of the operation, followed, after awakening from the anesthetic, by an intravenous injection of 400 cc. of a 4 per cent hypertonic solution of sodium chloride. A second and then a third injection of 300 cc. each of a 4 per cent hypertonic solution of sodium chloride, controlled by the previous determination of the chlorides in the blood and in the urine of the patient, are given to him on the second and third days after the operation. The author obtained satisfactory results in three cases. One of the patients had renal insufficiency complicating the prostatic disease for which the operation was performed. In all cases the condition of the patients followed a favorable evolution: Hyperazotemia did not appear, the urinary secretion was practically normal with a nearly normal elimination of chlorides, the loss of weight was minimal, and there was an early elimination of gases during the first twenty-four or forty-eight hours after the operation by which intestinal and painful abdominal complications were prevented.

41: 1001-1072 (Oct. 4) 1934. Partial Index

Bronchopulmonary Forms of Grip. A. A. Rissotto.—p. 1001.
*Nontuberculous and Tuberculous Dilatations of Calices of Renal Pelvis. J. Salleras.—p. 1008.
*Pseudotumoral Form of Syphilis of Bones. Sara Satanowsky and R. Favergiotti.—p. 1010.
Calcium in Human Organism. Herta G. Otte.—p. 1013.
Encephalitis Sclero-Atrophicans (Diffuse Sclerosis): Clinical and Anatomopathologic Study. R. Carrillo.—p. 1033.
Oxygen Therapy by Subcutaneous Route in Crisis of Asthma. W. Howard and V. C. Giardinieri.—p. 1050.
Nocturnal Incontinence of Urine Due to Spina Bifida Occulta: Case. H. D. Berri.—p. 1051.
Coramin Injection in Fetal Suffering. A. C. Kunz.—p. 1053.

Dilatation of Calices of Renal Pelvis.—Salleras says that pyelography permits the differentiation of the painful nontuberculous form of dilatation of the calices of the renal pelvis from the painful tuberculous form, as well as the establishment of a diagnosis of the association of the two types of dilatation in one and the same kidney. The pyelogram, in cases of painful nontuberculous dilatation, shows the borders of the ends of the renal calices, in their site of papillary implantation, regular and well defined. The image of the kidney is clear. The dilatation is uniform in the main calices of the kidney so that the kidney appears in the pyelogram like the shadow of a clover leaf. The pyelogram in cases of painful tuberculous dilatation shows the presence of tuberculous ulceration, and the shadow of the kidney is blurred and uneven. The pyelogram in the associated form shows blurred spots at the site of tuberculous lesions and the typical clear aspect of nontuberculous dilatation at the nontuberculous areas. Two cases of the painful nontuberculous and the painful associated nontuberculous and tuberculous forms are reported. In both cases the study of the kidney, removed by nephrectomy, permitted the verification of the pyelographic diagnosis.

Pseudotumoral Form of Syphilis of Bones.—Satanowsky and Favergiotti say that when a medical antisyphilitic treatment fails to improve bone lesions, which by their roentgen aspect and by the examination of the patient seem to be of syphilitic origin, it is advisable to resort to a different medical antisyphilitic treatment before deciding on the performance of a mutilating operation or even of an exploratory operation. They report the case of a syphilitic patient who had a negative Wassermann reaction and who was suffering from a pseudotumoral syphilis of the femur. A combined treatment consisting of intravenous injections of 0.02 Gm. of mercuric cyanide every other day, and oral administration of 5 Gm. of potassium iodide daily, resulted in a marked deterioration of the patient and in the appearance of a tumor at the site of the bone lesion, which on histologic examination of some fragments obtained during an exploratory operation proved to be a chronic inflammatory process of the muscular tissues with abundant proliferation of the connective tissues and hyaline degeneration of the muscular fibers. The process was interpreted by the authors as a propa-

gation of gummas from the syphilitic bone lesion, which invaded the surrounding tissues. The change of treatment to the administration of quinine-iodide-bismuthate injections, each injection containing 0.16 Gm. of bismuth and given every other week, resulted in the speedy disappearance of the tumor and a marked improvement of the general condition of the patient.

Archiv für Gynäkologie, Berlin

158: 1-172 (Sept. 19) 1934. Partial Index

Cysts in Vagina of Fetuses. Erna Vilas.—p. 1.
Sarcoma of Renal Capsule Simulating Ovarian Tumor. J. Ruzicska.—p. 14.
Is Intersexuality Cause of Virilism in Ovarian Tumors? G. Krediet.—p. 22.
*Porphyrin Elimination During Normal Pregnancy and Its Relation to Blood Pigment Metabolism. C. Carrié and L. Herold.—p. 54.
Calcium Content of Cerebrospinal Fluid. E. Vogt.—p. 60.
Ovarian Tumors Consisting of Thyroid Tissues. H. O. Kleine.—p. 62.
Dysgerminomas of Myometrium. W. Schiller.—p. 76.
*Clinical Aspects of Ovarian Dysgerminoma. H. O. Kleine.—p. 89.

Porphyrin Elimination During Pregnancy.—Carrié and Herold studied the porphyrin elimination in healthy pregnant women by means of the spectrocolorimetric method. They found that toward the end of pregnancy there is a gradual decrease in the elimination of porphyrin. They explain the relations between the porphyrin metabolism and the blood pigment metabolism and are of the opinion that the reduction in the porphyrin elimination, in spite of the increase in the disintegration of erythrocytes at the end of pregnancy, is due to the fact that the hemoglobin derivatives (porphyrin) are largely taken up by the fetus to serve in the formation of blood.

Clinical Aspect of Ovarian Dysgerminomas.—Kleine reports the histories of seven patients with dysgerminoma. The patients were free from hermaphrodism, but they were of the hypoplastic asthenic type. Their ages varied between 15 and 24 and one was 30 years old. The author points out that the dysgerminoma is characteristic for young women. In five patients the dysgerminoma was unilateral, in one bilateral, and in one it was at first unilateral but, shortly after the one tumor had been removed, another one developed on the other side. Rapid growth seems to be a characteristic of this type of tumor. Histologic examination disclosed in all cases the typical picture of the solid, large cell, round-cell carcinoma, the growth of which was either alveolar or strand-like. The author compares the hormone reactions of the three types of blastomas of the female gonad, of the granulosa blastomas, arrhenoblastomas and dysgerminomas. The Aschheim-Zondek reaction is negative in all three types, but the folliculin reaction (estrus reaction) is positive in granulosa blastoma but negative in the two other types. The testicular hormone reaction is doubtful in all cases, but it may be positive in some cases of arrhenoblastoma and negative in the other two types. One of the patients observed by the author had a normal delivery before the operation, and another patient gave birth to two normal children following the removal of the left ovary on account of a dysgerminoma, the size of a child's head. This proves that the healthy ovary of a woman with dysgerminoma may retain its function. But, on the other hand, one of the patients died as the result of a rapidly growing dysgerminoma of the left ovary, six months after a dysgerminoma had been removed from the right ovary. Three patients have remained healthy after the removal of the dysgerminoma for periods of seven, sixteen and twenty-four years respectively.

Chirurg, Berlin

6: 633-664 (Sept. 15) 1934

*Clinical Results with Links' Test in Early Diagnosis of Carcinoma. H. Weber and F. Schüle.—p. 633.
Discussion of Anesthetics and Their Indications. E. Schmutzler.—p. 641.
Perityphlitic Abscess in Childhood. E. Bumm.—p. 645.
Stimulating Expectoration with Primulasaponin in Postoperative Bronchitis. H. Assheurer.—p. 650.
Technic of Operation on Sacral Fistula. D. Kulenkampff.—p. 653.

Clinical Experience with Links' Early Diagnosis of Carcinoma.—Weber and Schüle report their results with Links' serum diagnosis of carcinoma in 100 clinical cases. Blood is drawn from the cubital vein into a receptacle so arranged that each stage of coagulation can be separated, yielding three serum fractions instead of one. The three specimens are subjected to a chemical analysis consisting of the determination of the number of cations utilizing the potassium and magnesium content of the serum. The three fractions are placed in receptacles and are treated by heat so as to rid them of all organic particles. The resultant clear fluid is examined for its potassium content by titration and for magnesium by a colorimetric micromethod. It is not the total of the six figures obtained but the relationship of the total to the erythrocyte count that determines whether the test is positive or negative. The authors do not furnish further details except to state that figures above 100 are considered a positive test, while those below are considered negative. The test was positive in the forty-one cases of definitely established carcinoma. In a control group of forty-two cases that were definitely not carcinoma, five gave a figure above 100, in other words were positive. This gives 88.1 per cent of correct results and 11.9 of errors. In a third group of eleven suspected cases of malignancy, the test proved to be correct in seven, probably correct in two, and undetermined in two. The authors feel that the small number of cases tested does not allow any conclusions regarding its specificity. It appeared significant, however, that all the sarcoma cases gave a negative result suggesting a specific response of the part of the epithelial tumors.

6: 665-696 (Oct. 1) 1934

*Sexual Operations. A. Fromme.—p. 665.
Refined Mechanics in Treatment of Fractures. H. Schupp.—p. 681.
Percussion as Diagnostic Means in Acute Surgical Diseases of Abdomen. F. O. Mayer.—p. 684.
Blood Transfusion. P. G. Schmidt.—p. 686.

Sterilization Operations.—In discussing the new law for prevention of hereditary diseases, Fromme states that the German law makers regard sterilization performed for purely social indications as a mutilation subject to severe punishment. Because the operation in man is easy to perform, the law specifies that it may be done in specified institutions only, and by appointed surgeons. Thus far no legislation exists permitting the marriage of a normal person with one congenitally abnormal but sterilized. The author warns that the operation of sterilization may be needlessly performed in cases of azoospermia and cryptorchism. The term vasoresection recommended by Haberland was given legal acceptance. The question of how soon after vasoresection the person is rendered sterile has not been settled. Spermatozoa may remain alive in the seminal vesicles and in the efferent ducts for a long time. The question of the length of quarantine after vasoresection is bound up with the solution of this question. No profound hormone disturbance is to be feared, because spermatogenesis, while temporarily diminished as the result of stasis, soon recovers and may continue for a number of years. That the patency of the duct can be restored by an operation was demonstrated by Monaco in animal experiments. It would therefore be possible for a sterilized person to circumvent the law by having a restoring operation performed outside of Germany. The author is inclined to minimize the effect on the libido in the sense of a Steinach operation after a bilateral vasoresection. In discussing castration the author calls attention to two interesting phenomena recently pointed out by Lange in his observations on 310 castrated men; namely, the development of gynecomastia in thirty-two and an increase in height of more than 2 cm. in persons past the physiologic age of growth. The author is of the opinion that castration will fail in a high percentage of cases to cure the sexual aberration for which it is performed. Not only does the libido as well as potency frequently persist after castration, but it is evident that the libido is grounded at least as much in the psychology of the person as it in his testicles.

Klinische Wochenschrift, Berlin

13: 1417-1448 (Oct. 6) 1934. Partial Index

*Influence of Diathermy on Blood Perfusion of Brain. J. Frey and M. Schneider.—p. 1419.
Adenyl Acid in Central Nervous System. C. Riebeling.—p. 1422.
Nervous Complications in Diphtheria. P. Mühlenkamp.—p. 1424.
*Takata Reaction and Pregnancy Toxicosis. W. Neuweiler.—p. 1428.
Behavior of Respiratory Sound in Region of Caverns. R. Cobet.—p. 1429.
Leukemic Changes in Bones in Roentgenogram. G. Paschlau.—p. 1430.

Influence of Diathermy on Blood Perfusion of Brain.—Frey and Schneider give a theoretical explanation as to why, in diathermy of the skull, the temperature of the brain can be

elevated only slightly. They demonstrate this fact in experiments on dogs, which revealed that the diathermic heating of a portion of the brain of a living dog amounts to only from 2 to 10 per cent of that of the musculature. However, diathermy of the skull effects a dilatation not only of the vessels of the skin and the muscles but also of the cerebral vessels. This dilatation of the cerebral vessels may be induced by applying diathermy merely to the facial portion of the skull, and, if this is done, the slightest heating of the brain is avoided. The diathermic dilatation of the cerebral vessels is thus not to be explained as a heat action but is doubtlessly due to reflex action. The authors think that the elicitation of the meningeal reflex described by the Schneiders is the important factor.

Takata Reaction and Pregnancy Toxicoses.—Since the Takata reaction is positive in certain hepatic disorders, particularly cirrhoses of the liver, and since pregnancy toxicoses are accompanied by various symptoms of a disturbed hepatic function, Neuweiler determined the outcome of the Takata reaction in the severe toxicoses of pregnancy. He employed the technic described by Jezler. The reaction was negative in healthy pregnant women, in five women with uncomplicated pregnancy kidney, in nine with threatening eclampsia and in six with manifest eclampsia. Even in the severest cases of eclampsia, which ended fatally and in which the histologic examination disclosed severe changes of the liver, the Takata reaction was negative. Five women with severe toxic hyperemesis, in three of whom abortion had to be performed because of severe hepatic disturbances, likewise had a negative Takata reaction. The author made control tests on patients with cirrhosis of the liver and always obtained a positive Takata reaction. He concludes that in pregnancy toxicoses the Takata reaction has no value as a functional test of the liver.

Medizinische Klinik, Berlin

30: 1285-1316 (Sept. 28) 1934

Treatment of Diseases of Liver and of Biliary Passages. E. Lauda.—p. 1285.
Gymnastics for Women. W. Knoll.—p. 1290.
*Duodenal Diverticulum and Pancreatitis. A. Frentzel-Beyme.—p. 1296.
Does Filling of Bile Passages by Gastric Contrast Mediums Prove Impairment of Liver? H. Engels.—p. 1299.
*Characteristics of Structure of Descendants of Diabetic Patients. Fryda Edelmann.—p. 1300.
Presence of Tubercle Bacilli in Blood and Cerebrospinal Fluid of Patients with Chorea. E. Loewenstein.—p. 1300.
Pharmacologic Examination of Extract of Pine Needles. G. Taubmann.—p. 1302.

Duodenal Diverticulum and Pancreatitis.—On the basis of seventeen case histories, Frentzel-Beyme explains the connections between duodenal diverticulum and pancreatitis. The characteristic pain on the left side or in the back, the pancreatic stool and the increased or greatly fluctuating diastase values are the most significant of the symptoms indicating pancreatic involvement. Increased blood sugar content and the enlargement of the space of the head of the pancreas may indicate pancreatic involvement, but they are frequently absent. At any rate, a negative roentgenologic examination does not definitely exclude impairment of the pancreas. The author thinks that his observation that in extensive destruction of the pancreas there is usually a gastric subacidity requires further investigations on a larger material. In case of duodenal diverticulum there exist nearly always atypical intestinal disorders (heartburn, nausea, vomiting and a sensation of pressure in the gastric region). If the pancreas is involved from the beginning, which is the case when the duodenal diverticulum is located at the duodenal papilla, typical pancreatic symptoms are generally disclosed by the anamnesis. In these cases the course is usually rather severe and there is danger of acute necrosis of the pancreas. The duodenal diverticulum causes disturbances only when it retains substances and subsequently becomes inflamed. This is the case when the pedicle connecting the duodenal canal with the diverticulum is rather narrow. If the pancreas is in the normal position, it becames involved in the disturbances only if the diverticulum is on the concave side of the duodenum. The clinical manifestations vary greatly in duodenal diverticulum and the diagnosis requires considerable study.

Descendants of Diabetic Patients.—Edelmann observed that in women descending from families in which there is diabetes mellitus the extremities, particularly the lower ones, are extremely slender. This slenderness is especially noticeable immediately above the ankle and the wrist. Moreover, the curvatures resulting from the bellies of the muscles, which are noticeable in normal persons, are generally lacking in these descendants of diabetic families. The author found also that the history of diabetes was usually in the paternal branch of the family. Thus it appears that the hereditary transmission of these characteristics goes through the father and is passed on to the female sex. But the author observed also a number of men with thin and weak lower extremities in whom the ancestry was diabetic. Persons with these characteristics do not necessarily contract diabetes, but those in whom there exists a considerable disproportion between the extremities and the trunk (adiposity of abdomen, hips and breasts) seem to have a predisposition for diabetes mellitus. The author inquired also about the ancestry of persons with extremely plump lower extremities and found that in these cases there was a history of diabetes mellitus in the maternal branch of the family. However, the latter material was comparatively small and further observation will be necessary.

30: 1317-1348 (Oct. 5) 1934. Partial Index

Research on Allergy and Eye. W. Riehm.—p. 1317.
Medical Problems in Aviation. G. Schubert.—p. 1321.
Diagnosis and Therapy of Cancer of Rectum. F. Mandl.—p. 1326.
*Symptoms Resembling Those of Typhoid, Particularly Intestinal Ulceration, in Hemorrhagic Aleukia and Acute Lymphatic Leukemia. R. Klima and H. Rosegger.—p. 1328.
Large Urinary Calculus in Child. G. Freund.—p. 1334.

Typhoid-Like Symptoms in Diseases of Blood.—Klima and Rosegger describe two cases of hemorrhagic aleukia and one case of acute lymphatic leukemia in which typhoid-like symptoms appeared. After the symptoms of the blood disorders had existed for a time and the patients had been treated for blood disease, there developed meteorism, abdominal pains (colics), tar stools and fever. All three cases terminated in death and the necropsies revealed intestinal ulcerations. Following a review of the literature, the authors stress that they do not deny that hemorrhagic typhoid is possible, for they are aware of the fact that thrombopenia is almost a typical symptom of abdominal typhoid and that some authors have observed a certain parallelism between the seriousness of the typhoid and the hemorrhagic symptoms. However, they think that the cases reported here are a proof that the reverse may be the case; namely, that typhoid-like symptoms may develop in malignant thrombopenia or in hemorrhagic aleukia.

Münchener medizinische Wochenschrift, Munich

81: 1487-1524 (Sept. 28) 1934. Partial Index

Serotherapy of Pneumonia. H. Becker.—p. 1487.
*Otitides of Nurslings and Connection Between Otitides and Intoxication. M. Litschkus.—p. 1492.
Abortion. Dörfler.—p. 1495.
Acute Suppuration of Middle Ear in Residual Conditions. H. Richter.—p. 1498.
Clinical Aspects of Bone Marrow Impairments in Kyphoscoliosis. J. Schüller.—p. 1503.
*Significance of Overextension of Muscles in Paralyses. P. von Puky.—p. 1505.

Otitides of Nurslings.—Litschkus, after calling attention to the high incidence of otitides in nurslings, points out that these processes remain frequently undiagnosed. He thinks that the ears of a nursling should be examined whenever there is fever and the cause of this fever cannot be determined. In intestinal disturbances that are not caused by faulty nutrition, otoscopy is absolutely necessary. The author thinks that there is a connection between intestinal intoxication of nonalimentary origin and the suppurating processes of the middle ear and that in the majority of these cases the process of the ear is the primary disorder. He stresses that every pediatrician should master the technic of otoscopy.

Overextension of Muscles in Paralyses.—According to von Puky, extensive muscular paralysis may completely disappear after the acute stage of anterior poliomyelitis. In nearly all cases, at least some of the paralyzed muscles regain their function during the stage of reparation; that is, from one to two years after the acute stage. All muscles of the spinal nerve ganglion that have not been destroyed by the infection but have lost their function merely as the result of the pressure

of the inflammatory edema may regain their function during this time. Whether the paralysis of a muscle is due to a destruction or only to an edema of the ganglion cells can be recognized only from the duration of the paralysis. It is therefore important that, after the disappearance of the acute manifestations, the paralyzed muscles receive the right kind of treatment. The author thinks that the effect of galvanization has been overestimated, that in fact it is unnecessary, and that massage and muscular exercise are a better stimulus for the muscles than electricity. However, in resorting to these treatments, measures must be taken to prevent overextension, for, if this is not done, reparation may fail and contractures may develop instead. The contractures result from a disturbance in the muscular equilibrium and in turn cause overextension, which prevents repair of the musculature even if the ganglion cell has become normal again. A paralyzed muscle must be kept relaxed or at least protected against overextension until time (in poliomyelitis about two years) has shown whether the paralysis is a permanent one. The same applies also to paralyses caused by other disturbances: by obstetric trauma, injury, suture of a nerve, neuritis, myelitis and so on. At any rate, the treatment of a paralysis without the proper care for the relaxation of the impaired muscles is a grave mistake. The author shows that overextended muscles can be made to function by removing the contractures. He cites cases in which favorable functional results were obtained after ten years or even longer. He describes in detail one case in which osteotomy of the right foot, tenotomy of the plantar fascia and lengthening of the achilles tendon with a subsequent plaster-of-paris cast resulted in considerable improvement of the function of muscles that for thirty-seven years had appeared to be paralyzed.

81: 1525-1566 (Oct. 5) 1934. Partial Index

Oral Bismuth Therapy of Syphilis. P. Mulzer and S. Serefis.—p. 1525.
Epidemiologic Significance of "Atypical" Diphtheria of Skin. T. Grüneberg and F. Weyrauch.—p. 1527.
*To What Extent Can Observations on Cerebrospinal Fluid Indicate Treatment in Syphilitic Disturbances of Central Nervous System? C. Riebeling.—p. 1529.
Severe Icterus. H. Müller.—p. 1533.
Animal Blood in Treatment of Exophthalmic Goiter. Eleonore von Balden.—p. 1541.
Calcium Gluconate as Local Anesthetic. G. Tavares.—p. 1543.

Syphilis of Central Nervous System.—Riebeling emphasizes that malariotherapy is the best method in dementia paralytica that has not been treated as yet, and he considers it wrong to use any other treatment. However, when a repetition of the fever therapy becomes necessary, the choice of treatment is debatable. In discussing the aspects of the cerebrospinal fluid of untreated dementia paralytica the author points out that in the present status of serology it is no longer enough to know that the Wassermann reaction is positive. If the inactivated cerebrospinal fluid does not contain Wassermann reagins, the diagnosis of dementia paralytica must be doubted. The cell count is between 20 and 100, but an increase in cells without other changes is of no value for the diagnosis. An increase in the protein content is characteristic for dementia paralytica, but it should not be overlooked that the protein test may be negative in spite of an increase in globulin. The precipitation of colloids (colloidal gold or mastic) is especially characteristic of dementia paralytica. After stressing that it is advisable to study the different protein fractions and their relations to one another in the cerebrospinal fluid of patients with dementia paralytica, the author points out that after fever therapy the cerebrospinal fluid may present widely varying pictures. He thinks that, if the fluid has a normal number of cells, a negative Wassermann reaction and only a slight increase in the globulin content and, if the colloid curves have become flatter, renewed treatment is not necessary for some time but that it is necessary to keep these patients under constant control. He admits that the improvement of the paralytic patient does not run parallel with the changes in the cerebrospinal fluid, but he shows that the repeated examination of the cerebrospinal fluid is helpful in determining the prognosis and that it is a great aid in deciding whether specific treatment should be repeated. He emphasizes that following unsuccessful malariotherapy a repetition is not only unnecessary but should be avoided.

Wiener klinische Wochenschrift, Vienna

47: 1153-1184 (Sept. 28) 1934. Partial Index

*Results of Surgical Treatment of Chronic Icterus. W. Denk.—p. 1153.
Metabolic Studies in Diseases of Brain Stem. D. Adlersberg and R. Friedmann.—p. 1156.
Early Diagnosis of Carcinoma. W. Schiller.—p. 1161.
Behavior of Leukocyte and Other Blood Pictures in Case of Mikulicz Disease After Short Wave Therapy. P. Groag.—p. 1165.
Alleviation of Pain During Delivery by Intravenous Anesthesia with Simultaneous Intravenous Stimulation of Uterine Contractions. G. von Bud.—p. 1169.
Angina Pectoris with Symptoms of Coma in Patients with Diabetes Mellitus. L. Horvai.—p. 1169.
Natural Nutrition. H. Koch.—p. 1172.
Evaluation and Treatment of Uterine Myomas. C. Bucura.—p. 1174.

Surgical Treatment of Chronic Icterus.—According to Denk, the dangers of an operative intervention in chronic icterus are frequently overestimated. He reports his observations in sixty-one cases in which operation was resorted to. He shows that, if the necessary precautions are taken, the surgical risk is not sufficient to justify undue postponement in the hope for a spontaneous recovery. Many surgical failures are caused by complications of the lithiasis, which could have been avoided if the intervention had taken place earlier. In evaluating the measures that aim at the reduction of the operative risk, the author stresses blood transfusion as an excellent prophylactic and therapeutic measure against cholemic hemorrhage. To counteract the retardation of blood coagulation, he recommends the administration of calcium salts. The greatest risk involved in the operation is the complete failure of the hepatic function, because it cannot be counteracted as successfully as the hemorrhagic tendency. Nevertheless, the administration of large amounts of fluid, of dextrose and of insulin will aid the function of the liver sufficiently to prevent its complete failure, provided, of course, the damage has not advanced too far. The form of the anesthesia is likewise of vital importance for the success of the treatment. Chloroform and tribrom-ethanol must be dispensed with at all costs and ether should be used only if absolutely necessary, and then very sparingly. In slender persons the intervention may be made by local and splanchnic anesthesia, and in sensitive corpulent patients nitrous oxide anesthesia is the method of choice, particularly in combination with local anesthesia, because it has no unfavorable effect on the liver. The intervention itself should, if possible, be limited to the removal of the obstruction, to the discharge of the bile. The small, contracted gallbladder should be left alone if possible. If it still contains calculi, they should be removed by cholecystotomy, but not before the completion of the intervention on the choledochus. The choledochotomy is done in the transverse direction, if possible, directly over the calculus or slightly above it. Before completion of the intervention on the choledochus, the papilla should be explored and dilated. If exploration of the papilla proves impossible, the duodenum must be opened and the papilla inspected. It is advisable to avoid external drainage of the choledochus.

Zeitschrift für Kinderheilkunde, Berlin

56: 483-608 (Sept. 11) 1934

Pemphigus Neonatorum Simplex Congenitus. K. Herzmann.—p. 483.
*Etiologic Significance of Paracolon Bacilli in Enteral Diseases of Nurslings and Children. K. Hassmann and K. Herzmann.—p. 486.
*Investigations on Therapeutic Action of Apple and Banana Diet. T. Baumann and H. Forschner-Böke.—p. 514.
*Antianemic Action of Monovalent and Bivalent Copper. R. Rohland.—p. 546.
Development of Physical Strength in Children and Young Persons: Their Vital Capacity and Pressure Force. E. Schlesinger.—p. 550.
Anxiety Problem During Childhood. J. K. Friedjung.—p. 578.
Sugars, Structure of Which Resemble Sugars of Body, in Feeding of Nurslings. G. Malvoth.—p. 590.

Paracolon Bacilli in Enteral Diseases of Children.—Hassmann and Herzmann consider paracolon bacilli the atypical colon strains that do not ferment lactose. They found such bacilli in the stools of a large number of nurslings and children with enteral disturbances, during the disorder and frequently also a short while after. Relapsing intestinal disturbances concurred with the presence of paracolon bacilli in the stools. These observations and the demonstration of paracolon bacilli in the punctate of the small intestine in toxic cases seem to demonstrate the etiologic significance of paracolon bacilli for enteral disturbances. Continuous transplantation of the para-

colon strains proved that after a shorter or longer period they changed back into ordinary colon strains. The paracolon strains generally retained their characteristics the longer, the more severe the enteral disturbances caused thereby. On the other hand, studies on ordinary colon strains revealed that they may change into paracolon strains. It may be assumed that such variations develop likewise in the intestine and that they are etiologic factors in enteral disturbances. Paracolon strains may also serve as transfer agents for ectogenous infections. Colon strains that have undergone changes in the intestines of children with enteral diseases may be a source of infection for healthy children. The intracutaneous injection of sterile filtrates of paracolon cultures produced strong local reactions in guinea-pigs and in children. As a rule, the severity of the reactions was related to that of the enteral disturbance from which the paracolon strains had been derived. Filtrates from ordinary colon strains, which had been obtained by successive inoculations of paracolon strains or occurred together with them, caused no reactions or much weaker ones. The etiologic significance of paracolon bacilli in enteral disturbances is proved further by the results of agglutination tests, which, moreover, disclose relations of the paracolon group to the typhoid and paratyphoid groups.

Mode of Action of Apple and Banana Diet.—Baumann and Forschner-Böke show that, although the favorable influence of the apple and banana diet on diarrheal disturbances has been definitely established, the mode of action is still in dispute. Investigations on the latter problem convinced them that the pectins, particularly because of their great swelling capacity, are the most important therapeutic factor. They observed that the swollen, voluminous intestinal contents present in the case of the apple and banana diet stimulate the peristalsis and accelerate the passage, and thus counteract the stagnation of the ingesta, which results from the diarrhea. By the administration of pure pectins, it could be shown that they increase the peristalsis and also have an absorptive action. The fact that the diet provides almost exclusively carbohydrates and that it is practically free from fats and proteins should likewise not be overlooked. The acidification of the gastric contents by the malic acid may be of some influence in that it increases the bactericidal effects; but that this factor is only of minor influence was proved by experiments with neutralized apple and banana diets. The tannin contained in apples and bananas is likewise of only minor significance. That the buffer action of the pectins plays only a minor part in the therapeutic action of apple and banana diets was proved by buffer curves. The authors further report studies on the stools in the apple and banana diet. They determined the p_H, the buffering, the water, fat and mineral contents and the organic acids, and they discuss the results of these tests. They conclude that in older nurslings and in young children the banana diet gives better results than the apple diet.

Antianemic Action of Copper.—Rohland induced anemia in rats by a milk diet and then used them for the study of the antianemic action of copper. His studies corroborated that the addition of copper induces a more rapid action of the iron therapy. On the basis of studies on the action of monovalent and bivalent copper, he concludes that the efficacy of monovalent copper is not inferior to that of bivalent copper, and that the difference between these two types of copper is not as fundamental as that between the two types of iron. In cases with low hemoglobin content, monovalent copper seems to surpass bivalent copper, while following the increase in hemoglobin, the efficacy of the two types runs parallel.

Hospitalstidende, Copenhagen

77: 1005-1032 (Sept. 18) 1934

*Hereditary Angiomatosis (Osler's Disease) in Two Danish Families. A. Yde and M. Olesen.—p. 1010.
*Prognosis in Massive Hemorrhages from Ulcers. T. Christiansen.—p. 1023.

Hereditary Angiomatosis in Two Danish Families.—Study of five generations of these families shows that the ratio between the members free from hereditary angiomatosis and those afflicted with it is 55:20. Yde and Olesen conclude that the disorder here apparently depends on a dominant factor. They say that only the treatment of the anemia gives satisfactory results in this disease; reduced iron is effective and blood transfusion is given in marked cases. Universal therapy is of problematic value. Local treatment is directed partly to immediate hemastasis and partly to the greatest possible protection of the patient against further traumas to the angiomas. On the whole, the patients must be advised to abstain from marked exertion of any kind.

Prognosis in Massive Hemorrhage from Ulcers.—Christiansen's material consists of 289 cases of massive hemorrhages ascribed to gastric or duodenal ulcers, 211 of the patients being men. Purely medicodietetic treatment was given. Twenty-five, or 7.9 per cent, died, the mortality for women being 10.3 per cent and for men 7.1 per cent. In the first group, the patients having hemorrhages for the first time, the mortality was 8.9 per cent and for the second group, those having a recurrence, 5.9 per cent. In the sixteen cases in which necropsy was done, gastric or duodenal ulcers were established. Of the 289 patients 203, or 70.3 per cent, were in the first group; the remaining eighty-six had previously had one or more massive hemorrhages. Positive roentgenologic results were found in 101 of 167 patients, or 60.8 per cent. Ewald's test meal, given to seventy patients after the treatment was ended, showed hypersecretion and hyperacidity in 58.6 per cent. The ages of the patients in the first group ranged from 12 to 82, the maximum being between 30 and 40. For both groups the mortality rises considerably after 40, while recurrence as such does not seem to aggravate the prognosis. The prognosis seems to be better in cases in which the hemorrhage is the first and only symptom of ulcer than in those in which there have been symptoms of ulcers, but the duration of the ulcer symptoms apparently plays a subordinate part. The authors confirm that the prognosis seems to be poorer in recent years than formerly, and they are unable to explain this satisfactorily. Their material affords no evidence of periodicity in the frequency of the hemorrhages.

Hygeia, Stockholm

96: 625-657 (Sept. 30) 1934

*Tumor of Spinal Cord Treated Operatively and Presenting Inversion of Radius Reflex and Paralysis of Facialis: Case. Vera Johnsson.—p. 625.

Inversion of Radius Reflex and Paralysis of Facial Nerve.—Johnsson calls attention to the occurrence of symptoms from the cranial nerves in cervical tumors. In her case in a woman, aged 39, the diagnosis was hour glass tumor passing through the intravertebral foramen between the third and fourth vertebrae. There were only slight signs of injury to the central nervous system. As operation showed considerable compression of the spinal cord by the tumor, the absence of pyramidal symptoms from the lower extremities is regarded as noteworthy. After the operation the neurologic symptoms were accentuated and a number of new symptoms appeared, including inversion of the radius reflex and facial paresis. The only report on facial paresis in cervical tumors found by the author in the literature was that of Kraus and Silberman, in which two earlier cases are cited and seven personal cases of cervical tumors with paralysis of the lower part of the facial nerve are reported.

Ugeskrift for Læger, Copenhagen

96: 1029-1052 (Sept. 20) 1934

Functional Neuroses. H. I. Schou.—p. 1029.
Heart Insufficiency Treated with Digitalis Lanata (Digitalin): Twenty Cases. E. Jacobsen.—p. 1036.

96: 1079-1108 (Oct. 4) 1934

Plugging of Lung as Feature of Surgery of Cavern. J. Gravesen.—p. 1079.
*Blood Picture in Pulmonary Tuberculosis, Particularly Relation Between Sedimentation and Shifting to Left. S. Cold.—p. 1083.

Blood Picture in Pulmonary Tuberculosis.—Cold states that even with the simple technic he employed, with attention almost exclusively to the neutrophils, examination of the blood picture affords a valuable supplement to the sedimentation test, especially in the determination of activity and propagation of the disease, as a symptom of which shifting to the left in purely pulmonary cases seems superior to the sedimentation reaction.